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VOLUME XV FEBRUARY 22, 1926 NUMBER 3

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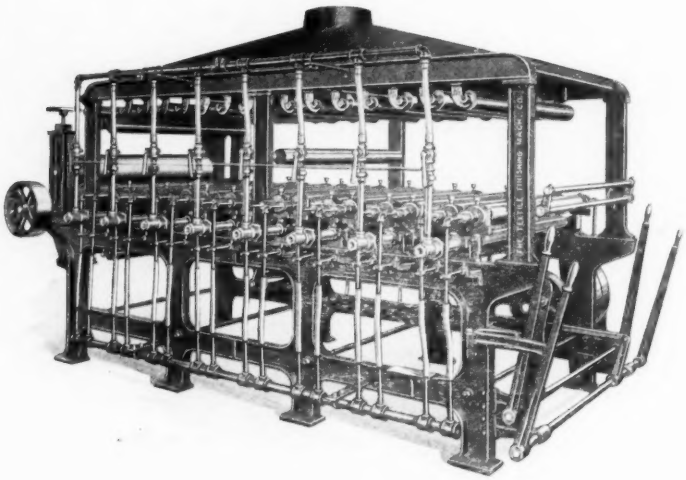

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American Dyestuff Reporter, Vol. XV, No. 3. Feb. 22, 1926. Published twenty-two times a year by Howes Publishing Co., Inc. 90 William Street, New York, N. Y. Domestic subscription, $5.00; Canadian, $5.50; foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the Act of March 3, 1879.

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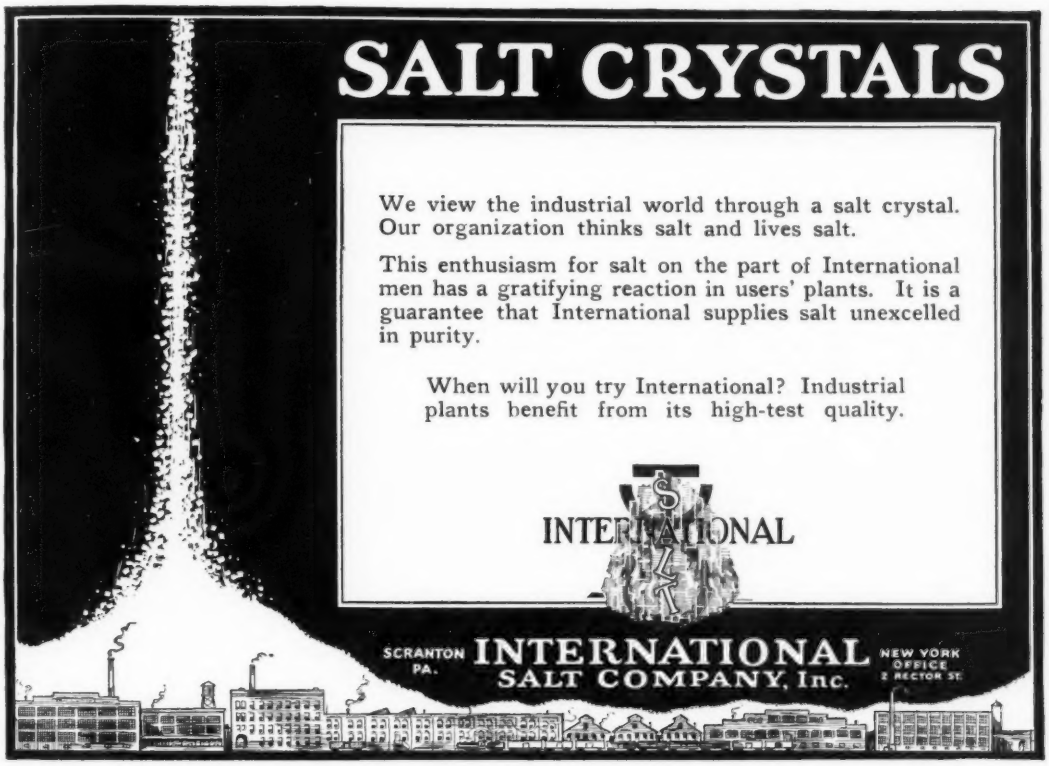
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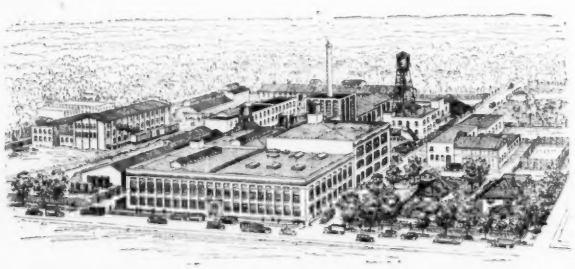

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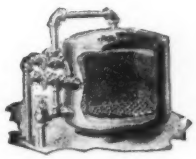

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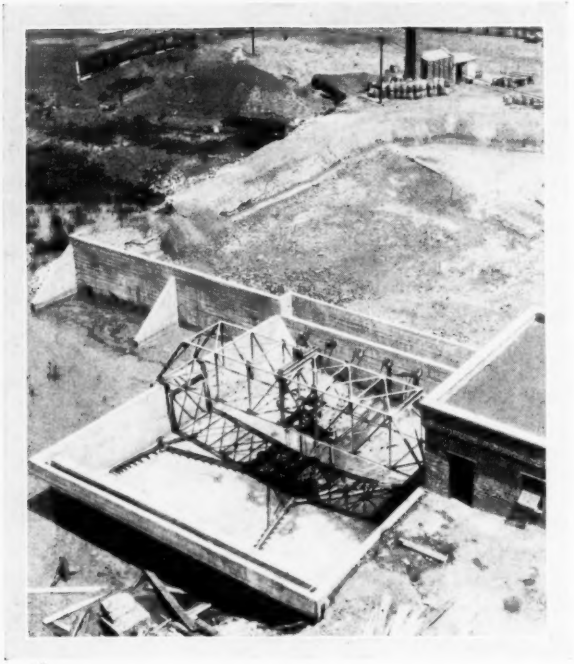

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VOLUME XV | NEW YORK, FEBRUARY 22, 1926 | NUMBER 3

A General Survey of the Dyeing of Artificial Silks or Rayons*

The Classification of Fibers and Their Dyeing Properties—Dyeing the Regenerated Cellulose Type of Rayon —Problems in Processing Acetate Silk—Special Dyes for Acetate Silk—Cross-Dyeing and Multi-Color Effects—Three-Color Effects—Troubles Mechanical and Chemical—Rayon Not a Substitute

By PROF. LOUIS A. OLNEY

Professor of Chemistry and Dyeing, Lowell Textile School

YOU have already heard a very interesting description of the properties and manufacture of the different types of rayon or artificial silk.**

It is my intention to continue in regard to its uses, devoting most of the time to the consideration of various phases of its dyeing and finishing. I shall deal with the subject in a general way, considering the dyes as groups rather than individually, and omitting as far as possible the detail of processes.

Most of you are not directly concerned with the textile industry, and many of you may not be fully conversant with the character of the dyes available for the purpose of coloring textile materials. It may, therefore, be well to spend a few moments in an endeavor to classify, from the dyer's point of view, the various fibers used by textile manufacturers, and also indicate a few rather broad groups into which the dyes may be divided. In this way we may be able to create a background which will prove of considerable value in developing a clear conception of the problems involved in the dyeing of the various types of artificial silk or rayon.

The classification of fibers shown in Table I recognizes three rather distinct groupings:

(1) The Animal Fibers.

(2) The Vegetable Fibers, including the Regenerated Cellulose Rayons.

(3) The Cellulose Acetate Rayons.

Between all three there is a decided difference in the chemical composition of the fiber substance. The animal fibers are nitrogenous, containing as high as 18 to 20 per cent of nitrogen. This nitrogen occurs to some extent in the form of complicated amino acids, a fact which adds considerably to the chemical activity of the fiber substance, the amino or (NH_2) groups exerting a basic action under certain circumstances and the carboxyl (COOH) groups, an acid reaction under other conditions.

The vegetable fibers on the other hand are non-nitrogenous, and do not contain carboxyl groups in their structure, but are for the most part carbohydrates of the cellulose type in which the hydroxyl (OH) groups are the most active, and these do not appear to be particularly reactive toward dyes. The regenerated cellulose, as the

A	Wool, Silk	Animal Fibers
B	Cotton, Linen	Vegetable Fibers
	Viscose, Cuprammonium, Nitro	Regenerated Cellulose
C	Celanese, Lustron	Cellulose Acetate Group

TABLE I

*A paper presented at the 108th meeting of the Northeastern Section of the American Chemical Society, at the Massachusetts Institute of Technology, Friday, February 12, 1926. In the absence of the author the paper was read by Prof. Charles L. Howarth.

**The paper was preceded by one by Dr. G. J. Esselen, Jr., entitled "The Chemistry, Manufacture and Uses of Rayon."

TABLE II

FIBER GROUP		Basic Dyes	Acid Dyes	Direct Cotton Colors	Sulphur Dyes	Vat Dyes	Mordant Colors	Special Dyes SRA, etc.
Group A	Wool	+ +	+ + +	+ +	—	+	+ + +	—
	Silk	+ + +	+ +	+ +	—	+	+ +	—
Group B	Cotton	—	—	+ + +	+ + +	+ + +	+	—
	Viscose	—	—	+ + +	+ + +	+ + +	+	—
	Cupram.	—	—	+ + +	+ + +	+ + +	+	—
	Nitro	+	—	+ +	+ +	+ +	+	—
Group C	Celanese	+ +	—	—	—	+	—	+ + +
	Lustron	+ + +	—	—	—	+	—	+ + +

term indicates, are practically pure cellulose and naturally act similar to cotton.

With the cellulose acetate group of rayons, however, we have an entirely different condition, for they do not contain any straight cellulose but instead a cellulose ester of acetic acid which, roughly speaking, contains almost as much acetic acid residue as cellulose residue. As a result these fibers have a reaction toward dyes entirely different from either of the first two groups.

In Table II an endeavor has been made to indicate in a compact manner the affinity or, perhaps better, the usability of the common classes of dyes in conjunction with the different fibers. At the left will be found the fibers in accordance with our classification of Table I and across the table the columns represent the different classes of dyes. Where a dye is applicable to the indicated fiber (+) signs are used, and where not usable (—) signs. The relative degree of usability is in some instances expressed by the number of (+) signs used.

In studying these tables it must be remembered that the general trend of the dyes as groups is recorded rather than absolute correctness as to each individual dye.

For instance, the action of acid dyes with acetate silk is put down as (—) although a very few acid dyes may be found that will dye this fiber. Again, the direct cotton colors with acetate silk are put down as (—). The actual facts of the case are that about 60 per cent of these dyes do not dye the fiber at all and the remainder for the most part only stain it or at the best dye it with difficulty. In the column marked Basic Dyes, their direct action is noted rather than their action in conjunction with a tannin mordant.

The important things to be observed upon this table are:

(1) That the fiber groups A, B and C act quite differently.

(2) That the regenerated celluloses for the most part act the same as vegetable fibers.

(3) That the acetate silks are in a class by themselves, acting quite differently from the animal and vegetable and regenerated cellulose fiber.

As a result of these differences it is possible to obtain two or even three color effects in the dyeing of fabrics which contain a combination of fibers of classes A, B and C.

Dyeing Properties of Regenerated Cellulose Type

The dyeing of rayons of the regenerated cellulose type, namely, the cellulose nitrate, cuprammonium and viscose silks, presented no unusual dyeing problems even during their early days. To be sure, certain difficulties have arisen in dyeing these fibers and material containing them, but these difficulties have been due to errors in mechanical manipulation rather than lack of methods of dyeing. Being in substance almost identical with cotton, these particular rayons may be dyed with the same dyes and in much the same manner. The dyeing properties of cellulose nitrate silk are the least like cotton of the three, but the reason for this is plainly seen if we consider that when formed it is really a cellulose salt of nitric acid and if allowed to remain in this condition it would be closely allied as far as chemical classification is concerned to the acetate silk, which is in reality a cellulose ester or ethereal salt of acetic acid. The process of rendering the cellulose nitrate silk non-inflammable, commonly designated as denitrating, converts this salt-like compound largely, although perhaps not wholly, into a form quite similar to the cellulose from which it was originally made. The dyeing properties of cellulose are therefore for the most part restored but not to the same

extent as in the case of the cuprammonium silk which when finally finished is practically pure cellulose. This difference in the dyeing properties of cellulose nitrate silk is exhibited chiefly in its greater affinity for basic dyes. In fact, it is possible to dye the nitro silk directly and quite satisfactorily with certain selected basic dyes. To apply basic dyes to the viscose and cuprammonium silks a tannin mordant is essential. Even with the nitro silk better and faster colors are produced in conjunction with a tannin mordant.

Direct cotton colors and sulphur dyes are applied to all three of these silks by methods similar to those of cotton dyeing. Lower temperatures are used, especially in the case of the nitro silk, and also a reduced percentage of Glauber or common salt. Alkali as well as sodium sulphide should be reduced to a minimum and caustic alkali entirely omitted if possible. The addition of sulphonated oils is also decidedly beneficial.

The vat dyes are also applied in a manner similar to that for cotton dyeing, that is, in an alkaline, hydrosulphite reduction vat.

As is the case with cotton the acid dyes have no real affinity for the regenerated celluloses under any conditions and the mordant dyes only when used in conjunction with certain metallic mordants.

Problems in Processing Acetate Silk

The cellulose acetate silks, however, presented problems in dyeing which did not exist as far as the regenerated cellulose silks were concerned; in fact, it was found that this material acted entirely different from any other fiber. Its obstinacy, as you might call it, when it came to the absorption of dyes, led to the prediction on the part of some of the less visionary that it would never become extensively used as a textile fiber. About the only members of the regular list of dyes for which it showed any special attraction were the basic colors and these, of course, did not offer anything very promising as far as fastness was concerned. Most of the direct cotton colors showed little if any affinity and the acid dyes even less. Many of the existing dyestuffs were tried and by going through the whole list in an exploratory manner one would be found now and then that was an exception to the rule or which by some unusual or freak method might work with some degree of satisfaction. The so-called "cellutyl colors" were a specially selected group of such miscellaneous dyes.

One of the early attempts to solve the problem of dyeing acetate silks was the application of the principle of saponification or deacetylation to the cellulose acetate. It was found that by treating the acetate silk with caustic alkalies, hydrolysis took place and the fiber substance became almost identical with that of the regenerated celluloses. The saponified fiber immediately developed a marked affinity for dyestuffs and could be dyed with direct cotton, sulphur, vat, and other dyes in a similar manner to cotton. This method, however, proved to be decidedly impracticable, since it impaired some of the most valuable properties of the fiber, and the removal of the acetyl group necessarily brought about a great loss in weight. Furthermore it was difficult to carry out this hydrolysis uniformly and as a result uneven dyeing usually followed.

In some instances it was found that the addition of certain metallic salts facilitated the absorption of dyes and a number of patents were taken out covering their use.

Another important discovery was that acetate silk readily absorbed many amino bases as, for instance, aniline and some of its derivatives. Once on the fiber these amino bases could be diazotized and then developed with phenolic or napholic compounds, e. g., beta-hydroxy naphthoic acid, thus producing colored compounds or dyes within the fiber substance. As a result several series of suitable bases have been put upon the market under various trade names such as azonils, acedronoles and azonines. The silkons are also of this type.

Almost innumerable patents have been taken out for the dyeing of acetate silk, and Chas. E. Mullin in his exceptionally complete series of articles upon the dyeing of acetate silk which is being published in the American Dyestuff Reporter at the present time, gives with some detail no less than 135 methods for dyeing acetate silk, which have been described in the literature.

Notwithstanding this array of patents and processes it was not until those most vitally interested came to the realization that the problem of dyeing cellulose acetate could be satisfactorily solved only by devising special dyes or by producing some of the older dyes in a considerably modified form that real progress was made.

Special Dyes for Acetate Silks

One of the earliest and most successful attempts to produce a new type of dye suited for this purpose was the introduction of the Ionamines by Green and Saunders (J. S. D. C., Jan., 1923, page 10). The solubility of the Ionamines is due to an external or omega sulphonic acid group which splits off gradually during the dyeing process, liberating the insoluble dye base which is readily absorbed by the fiber. The dye base thus formed may in many cases be diazotized and developed with phenolic or naphtholic derivatives, giving a wide range of colors of very good fastness. The introduction of the Ionamines was a step in the right direction, but their application involved complications which did not wholly appeal to the practical dyer.

The most important advancement as regards the dyeing of acetate silk was the introduction, about two years ago, of the so-called SRA colors. These solved to a great extent the problem of easily producing, by direct dyeing, a wide range of colors of excellent fastness in most respects. They were the result very largely of the study and investigation of Dr. G. Holland Ellis, and were produced under his supervision at the works of the British Celanese Company. The characteristic properties of these dyes are described by Ellis in an article, entitled

"Dyeing by Colloidal Solubilization or Dispersion of Insoluble Coloring Matters." (J. S. D. C., Sept., 1924; reprinted in the Am. D. R. Nov. 3, 1924.)

According to Ellis the SRA methods of dyeing are the results of the conception of a means not of chemical but of "physical solubilization," or better "colloidal dispersion" of the ordinary insoluble coloring matters in order to render them properly available to the fiber. This was successfully accomplished by the use of sulphoricinoleic-acid (sulphonated castor oil), hence the characterizing name of SRA. It was found that when a ricinoleic-acid solution of a number of dyes and organic compounds ordinarily insoluble in water, was poured into water a dispersion of the particles took place which was so fine and so complete as to retain the characteristics of a water solution to such an extent as to pass freely through ordinary filter paper. Such colloidal dispersions may be neutralized and even made alkaline without apparently changing their character and from them acetate silk readily and uniformly absorbs the dye particles. Through exhaustive study and experimentation, also largely by the process of elimination, a series of dyes of remarkable fastness, brilliancy and range of coloring possibilities has been devised. They are all placed upon the market under the brand name of SRA colors* in the form of 10 per cent pastes, in which are incorporated both the dye and the dispersing medium, in such a form that they may be used as readily as any soluble dye.

The process of application is extremely simple. The necessary amount of dye paste is added to a soap bath and heated to 75 to 80 deg. Cent., and the material worked in this until the dyestuff has been properly absorbed. The addition of Turkey Red oil facilitates the absorption of dye, and when dyeing heavy shades a moderate quantity of salt may be added to advantage. Many of the SRA colors may be dyed cold and the individual dyes may be mixed to almost any extent in the production of compound shades.

In addition to the direct dyeing colors of this group there are the SRA diazo solamines, a series of amino bases or at least amino bodies capable of being diazotized. They are subject to colloidal dispersion through the same medium, sulpho-ricinoleic acid, and having been absorbed by the fiber from such a dispersion bath they are subsequently diazotized and developed.

The Duranol dyes of the British Dyes, Ltd., and the Celatine of the Scottish Dyes, Ltd., which are said to be sulphonated anthraquinone derivatives act similarly to the SRA colors. The Duranol dyes, however, are incorporated with a special dispersion medium quite different from the SRA colors but are applied by similar methods.

In the so-called sulphato dyes we have a group of modified acid dyes suitable for dyeing acetate silks. These are based upon the discovery that the presence of the ethereal sulphuric acid group $—C_2H.SO_4—H$ attached to nitrogen has a somewhat similar function to the sulphonic acid group. Certain dyes containing such groups are readily taken up by acetate silk from neutral, acid or alkaline baths producing a variety of shades of good fastness to light and washing.

Quite recently a group of Setacyl Direct dyes for acetate silk has been announced by the Geigy Company. They are in a powder form, directly soluble in boiling water, and may be applied to acetate silk in a neutral salt bath the same as direct cotton colors.

These developments in regard to the dyeing of acetate silk have for the most part taken place within the past three years. Through them there has been opened an entirely new trend of thought in regard to the application of dyes and with this an impetus to the further study of various phases of the theory of dyeing. Some even prophesy that the new knowledge gained through the quest of suitable dyes for acetate silk may eventually lead to radical modifications of our present methods of dyeing other fibers.

Cross Dyeing and Multi-Color Effects

A study of Table II will reveal several very pronounced differences between the dyeing properties of Fiber Groups A, B and C. By taking advantage of these differences it is easily possible to produce two-color effects in a single dye bath, and by using some discretion in the selection of dyes, and a little ingenuity in manipulation, even three-color effects may be produced upon undyed material if made with the proper mixture of fibers. In this way the lack of affinity of acetate silks for dyes is used to great advantage in the production of many attractive combination color effects, and what was originally thought to be a serious defect in their make up has really proven to be one of their most useful properties.

The simplest contrast effects may be produced upon mixtures of Group B and Group C fibers. For instance, if cotton or viscose rayon are combined with acetate silk the former may be dyed with a direct cotton color without even staining the acetate silk. By using a special acetate silk dye, e. g., one of the SRA colors, it is possible to reverse the process and leave the cotton or viscose unstained. The two processes may then be combined either by using separate baths or in a single bath, thus producing two-color effects of almost any degree of contrast.

In real silk and acetate silk combinations the real silk may be dyed with acid dyes and the acetate silk with SRA or similar dyes. Some of these dyes may also stain the silk to a slight extent, but this need not necessarily interfere with the production of excellent two-color effects.

In a real silk and Group B fiber mixture the real silk may be dyed with an acid dye, and the other fiber dyed with a direct cotton color. It is possible, by careful selection, to obtain direct cotton dyes that will scarcely stain the real silk, in which case the characteristic color of the acid dye will be maintained upon the silk. In case the direct cotton dye is one that dyes silk fiber the color on

*The manufacturers of SRA dyes hold exclusive rights that permit their use only in conjunction with Celanese.

the silk will be a combination of the two dyes. Thus if an acid yellow and a direct cotton blue were used the Group B fiber would be dyed blue and the real silk green.

It might be well to note that direct cotton dyes will often rather unexpectedly stain acetate silk. This may not be a fundamental defect of the particular direct cotton color, but due to the presence of a small quantity of some extraneous dye that has been added for shading purposes or to increase its brilliancy. To avoid such difficulties the manufacturers of the SRA dyes have put upon the market a brand of CR (Celanese Resist) colors which have been specially selected so as to avoid this difficulty.

Two-color effects may also be produced upon a Group B-Group C mixture by dyeing the Group C fibers with a basic dye and Group B fiber with a direct cotton color. In this case the proper choice of dyes and manipulation of temperature are of considerable importance. Basic dyes have a decided tendency to stain both fibers at low temperatures, but as the temperature rises the dye gradually leaves the Group B fiber and goes on to the acetate silk.

Three-Color Effects

In the production of three-color effects a mixture of all three fiber groups is commonly used. Thus a basic dye can be applied to the acetate silk Group C in a slightly acid bath, a direct cotton color to the Group B fiber, e. g., viscose or cotton, and an acid dye to the Group A fiber, e. g., silk, or wool. There would be a certain amount of overlapping, particularly between the acid dye and the direct cotton color, but nevertheless three distinct colorations may be produced. Other combinations may also be used in producing satisfactory multi-color effects.

Celanese and Lustron are fundamentally similar, but owing to the fact that they are manufactured by different concerns and by different processes they differ somewhat in their properties. Lustron will withstand higher temperatures and more alkali without affecting luster and strength than Celanese. Cotton piece goods with Lustron decorations may even be mercerized with caustic soda if the concentration is somewhat modified and the temperature kept at 40 deg. Fahr. or below. Lustron also has a greater affinity for basic dyes than Celanese. For these reasons Lustron has proved to be of considerable value in the production of multi-color effects and for decorative effect threads used in connection with woolen and worsted piece goods.

With both types of acetate silk it is well to keep the temperature as low as possible and reduce the alkalinity to a minimum. In general acid may be used more freely than alkali with the acetate silks, but the acid must be finally washed out at the end. Material containing Lustron should always be given an after-treatment with dilute sodium bicarbonate solution to insure that no acid remains. When acid must be used acetic acid is always preferable to mineral acids. Sulphuric acid should never be used with Lustron or a boiling temperature with Celanese.

Troubles Mechanical and Chemical

The dyer of artificial silk and of material containing this fiber often has worries and complications of a more serious nature than those coming from the actual application of the dyes.

In the first place various oils and softeners are frequently added to artificial silk to facilitate reeling, winding and processing in general. If these are of poor quality or of the wrong character they may cling to the fiber with great tenacity, and much difficulty may be experienced in removing them previous to dyeing.

When handling skeins the dyer has a constant struggle against tangling and every precaution must be taken in this direction or it may be impossible to satisfactorily reel the skeins after he is through with them.

Skein dyeing of artificial silk still has to be done by hand since no machine seems to have been devised for satisfactorily handling it in this form.

One of the most exasperating troubles is that of light and dark skeins. Certain skeins in the same lot of silk without any apparent reason will dye considerably darker or lighter than the others. Different lots from the same manufacturer will sometimes dye differently, and if these happen to be mixed in a woven fabric, unevenness of color is quite sure to result.

Serious troubles also frequently arise through the fact that many types of rayon lose much of their tensile strength when wet. The regenerated cellulose silks are undoubtedly the worst offenders in this respect since they often lose from 70 to 80 per cent of their original strength when wet out. Fortunately the original strength is restored upon drying, but before this takes place the fabric may have become hopelessly stretched out of shape.

The acetate silks are far superior in this respect. In their normal dry condition they are not as strong as the regenerated cellulose silks, but they lose so little when wet that their tensile strength under these conditions is superior.

In finishing a mixed fiber fabric unequal stretching of the rayon and lack of elasticity often causes troubles. All processes must be conducted in such a way as to avoid undue handling or stretching of the material when wet, and it should not be put through anything in the nature of a wringing machine.

In the home dyeing and dry cleansing of fabrics containing rayon, it is well to be sure which of the two types of fiber are present since they require different treatments. The so-called "home dyes," so many of which are on the market, will dye the regenerated cellulose silk quite well, if the material is carefully handled when wet, but most of them being of the direct cotton type will have little if any coloring action on the acetate silks.

Certain dry cleansing agents, particularly those of the halogenated type, also have a decided solvent action upon acetate silk, and may completely ruin a fabric if it contains much of this fiber.

The question is sometimes asked, "Why is it not pos-

sible to incorporate coloring matters with the spinning solution and produce a colored instead of colorless fiber and thus obviate the trouble and expense of dyeing. It would be possible to do this, in fact, it was done with some success during the early days of nitro silk. It is, however, impracticable for several reasons among which two are perhaps more outstanding than the others.

First, with practically all of the artificial silks the spinning solution is extremely sensitive to almost any extraneous influence. It must be prepared in a certain state of physical and chemical equilibrium in order to spin properly, and it is sufficiently difficult to properly maintain this condition even when practically the same spinning solution is used each time. The introduction of dyes of varying composition, and other necessary assisting chemicals would make it necessary to work out special spinning conditions for each dye or combination of dyes and undoubtedly complicate matters far in excess of any advantage that might be gained.

In the second place, the production of colored silk yarns by this method could not adjust itself to present day merchandising conditions. With styles and color requirements changing overnight, as it were, the manufacturer would continually find himself overstocked with colored silk for which there was no demand. Furthermore, the tremendous stocks of dyed silk which would have to be carried would be prohibitive.

Dyeing methods and the quality of dyed silk have also improved so much in the past few years that the desire for this direct method of coloring scarcely exists to-day.

In closing there are certain points to which I would specially call your attention:

First, that the rayons are not substitute fibers, but additional fibers. They do not replace either silk or cotton, but supplement them in many ways. When used with cotton, for instance, they make it possible to produce a fabric much more attractive in many ways at an extremely moderate increase in cost.

Second, that in many respects the rayons are quite different from other fibers, and therefore must be treated differently during the various dyeing and finishing processes. The disregard of this fact perhaps more than anything else has been responsible for the unsatisfactory results that have sometimes been obtained in the dyehouse and finishing room.

Third, that there are two very different types of artificial silk: those of the regenerated cellulose type and those of the cellulose acetate type. They are as different as are cotton and wool, and must be dyed by different methods and handled quite differently in many respects.

Finally, the rayons or artificial silks have undoubtedly come to stay and must be allotted their place among the commercial fibers. The textile industry must adjust itself to their entry and the consuming public must learn what these fibers will do and what they will not do and thus adapt itself to their possible uses.

KNITTING ARTS EXHIBITION "BIGGER AND BETTER"

Reservations for space in the Twenty-second Annual Knitting Arts Exhibition to be held at Commercial Museum, Philadelphia, from March 22 to 26, is in excess of the amount applied for at this time last year, according to a recent encouraging announcement from General Manager Chester I. Campbell.

The steady growth in size that this exhibition shows each year should be ample proof for anybody of the increasingly important position it is coming to occupy throughout the textile and knitting trades. For the past five years, since it was taken over by the present management, each year has shown a steady and satisfactory increase in size as well as an enlargement in the attendance of buyers from all parts of the country.

E. J. FEELEY, INC.

A new concern in the field of dyestuff distributors made its appearance recently with the formation of E. J. Feeley, Inc., with offices at 128-30 Oliver Street, Boston, the premises occupied for many years by the Boston office of H. A. Metz & Co. prior to the recent formation of General Dyestuff Corporation.

The personnel of E. J. Feeley, Inc., includes E. J. Feeley and his two sons, both of whom have previously been associated with their father in the Beacon Color & Chemical Company.

Mr. Feeley, Sr., has had a long and active career in New England dyestuff circles. He was for ten years a mill dyer and in 1896 became a salesman for Kalle & Co., coming to Boston as New England manager for this concern in 1906. This position he occupied until 1916 when he purchased a half interest in the Bay State Chemical Company which was immediately reorganized under the name of Beacon Color & Chemical Company. He was president of this latter concern until he retired on the first of the present month to form E. J. Feeley, Inc.

Mr. Feeley and his sons are widely known in New England dyestuff circles and are well equipped to render technical service to their customers. The new concern will handle a general line of dyestuffs and chemicals as well as a few exclusive specialties. The REPORTER wishes them all manner of success in their new venture.

WILLIAM J. WEED PROMOTED

William J. Weed has been promoted to the position of assistant manager of sales of the Electro Bleaching Gas Company, 9 East Forty-first Street, New York City. Mr. Weed has been a member of the Electro Bleaching Gas Company staff and their associate company, Niagara Alkali Company, for the past thirteen years, having secured a broad general background which, it is stated, fittingly equips him for his new position, especially because of the six years which have been devoted almost entirely to the pulp and paper field, in which industry he is widely known.

The Processing of Furs

Part I

Factors Affecting Characteristics of Furs—Effects of Climate on Furs—Fur Structure—Tanning Processes

By WILLIAM D. BAIRD

J. G. Rutherford & Co.

IT is not the hope or purpose of this paper to expose to milady the manipulations of the fur dressers and dyers, the gentlemen who labor in preparation of the beautiful garments with which she so attractively adorns her figure. The writer will merely attempt to set forth in some detail the many processes through which the skins go before becoming once again the things of beauty they were while elusively dashing through the forests, frisking on an iceberg, or wherever it was that the animals may have made their homes.

As an article of commerce, the value of a fur is governed by the ease or difficulty with which the animal is captured, the scarcity or abundance of the quadrupeds and, of course, to some extent, the dictates of fashion. Hence, a rabbit-skin as such may be had for very little cost during seasons when the demand is small for the better class furs of which rabbit imitations are made. Ermine, mole, sable, etc., on the other hand, comparatively scare and always in demand, bring high prices.

As just stated, the object of this writing is not to "tell on" the furrier, but since it is generally known that the "art of imitation" is practised in the business of furs, that many so-called sealskin coats, trimmings of moleskin, beaver and many other of the better furs had their beginnings on the backs of Bre'r Rabbit and other animals the skins of which are similarly low in value, it might not be out of order to determine just how some of these clever imitations are brought about along with a well-meant general description of the processing of furs.

It would be well, perhaps, to first consider some of the fur-bearing mammals in life, their various places of abode, habits of living, effects of climatic conditions upon and structure of the furs.

The differences in character and constitution of the many furs are vast, the manners and habits of living of the animals and the foods consumed by them being large contributing causes of these differentiations. It is only natural to assume that there should be a difference in the strength, durability and appearance of the furry covering of a vegetable-consuming and of a carnivorous or meat-eating animal. Incidentally, however, the majority of fur bearers belong to the latter class.

A few examples for comparison in this connection are the goat, hare or rabbit, sheep and its young or lambs which are members of the herbivorous class, those whose appetites are appeased by vegetables. None can deny the beauty of such furs when properly dressed, and, when necessary, dyed. The lasting qualities or durability, though, are low on an average, as compared with the skins of meat eaters. Such furs as those of the bear, wolf, wolverine and seal (in fact, not a member of either class subsisting for the most part on fish) have much greater lasting and wearing qualities than those of the vegetarians.

Effects of Climate on Furs

Climate, likewise, contributes mightily to the discriminating characteristics of finished furs. In the main, animals whose habitat is in the polar regions, yield furs that are white or very light in color. Polar bears, ermine and Siberian hare are some examples. No field of enterprise or line of endeavor apparently is complete without its exceptions, and an exception, in this instance, is the seal, the color of which is brown or brownish black.

In rare instances the skin of a seal is sufficiently light in color to be usable as a so-called white seal, by subjecting it to some bleaching agent.

Animals in the Northern climes produce, usually, skins of rare quality, those living in low temperatures and high altitudes having thicker and finer hair than their fellow members in higher temperatures and lower altitudes.

Age also has considerable effect upon the quality and color of a fur. The young, as a rule, have a thicker coat than the grown animals. This, combined with the fact that the color of the hair is lightened with age, would seem to bear out some theories held by Darwin and his followers.

The growth of hair on an animal is usually fullest in widwinter and best grades of fur are obtained between then and just before spring sets in. In spring, the hair begins to shed and in some instances continues to fall out even after the pelt has been dressed and finished. This very fact is often laid to faulty handling by the dresser and dyer when really the trapper alone is accountable.

Variations in the furs of animals of one species are often noted with regard to color and weight. The leather part often presents considerable differences as to weight, toughness and thickness. Bearskins per given area are the heaviest of all fur-bearing animals. The durability, incidentally, of hair and leather of this animal is among the best. Wolverine is generally the next heaviest pelt with even better lasting qualities than the bear. Land and sea otter follow with respect to weight, though lead all in durability.

Goat, leopard, seal and beaver are next in order with reference to weight, with beaver following bear, and seal runner up in durability. Goatskins are very poor in this last respect.

The skins of Russian pony, mink, muskrat, nutria, opossum, Persian lamb, krimmer, fox and kolinsky average about the same in weight and run somewhat lower than the seal with degrees of serviceability varying.

Ermine pelts per specified extent of surface are lightest in weight. Slightly heavier are the skins of squirrel and mole. Between the Russian pony group and the mole, in this particular, come the furs of sable, rabbit, raccoon, stone and baum martens, skunk and astrachan.

Summed up with degrees of serviceability in point the many and varied furs run about as follows:

Wolverine and otter come to the fore with the skins of beaver and bear surpassed only by the first two named. Next in the order come natural seal (dyeing has a slight deleterious effect upon most furs) leopard, mink (natural), Persian lamb, krimmer, raccoon, sable, baum and stone martens (natural), and muskrat.

Foxes follow the martens and muskrat in withstanding wear, and below these in their respective rank are the Russian pony, ermine, kolinsky, lynx, nutria and squirrel. Still further down come the pelts of chinchilla, goat and astrachan. The action of wear is greatest on rabbit skins with mole slightly better.

Fur Structure

The structure of a fur is intensely interesting. Of primary consideration is the furry or hairy covering, secondly the hide or leather part. Although second in claim of notice, much depends upon the condition of the leather portion in determining the value of a skin. Strength, weight, or rather lack of weight, suppleness and "feel" are of great importance.

Many, in fact, most furs, comprise two distinct kinds of hair. Next to the skin is found a short, thick, fine hair which is soft and woolly. This is known as the under-hair or the fur hair. Standing out from this is observed the guard hair, usually straight, long, course and more or less lustrous, also called the protective hair. These guard hairs in many furs make up much of their beauty. In others, when the underlying woolly division of hair is more important as regards attractiveness, the top hairs are plucked to enhance the fur's qualities.

After the skin has been removed from the carcass of an animal the first treatment it receives is one to check, for the time being, putrefactive changes and prevention of decomposition.

This is accomplished by a partial washing in water to cleanse it of any blood and dirt. It is then stretched on a suitably shaped board with the hair portion on the inside.

Next, all remaining particles of flesh and fat are removed by scraping and the skin is allow to dry in the air. In the case of some of the larger skins such as those of the leopard, seal and bear, this method of "curing" is somewhat altered. These are immersed in a brine solution, then stretched and dried or, if the location of trapping is within a few days of the dressing plant, the skins are kept moist.

Upon reaching the dresser the first step taken in this branch of the industry is a wetting out process. The preservative drying operation mentioned in the preceding lines is only a temporary one and further treatment must be given along with the soaking to prevent further decomposition, which again sets in when the pelts are moistened. Sometimes a salt solution of about 10 per cent in strength is used for soaking, the salt having a preservative action and a tendency to prevent loosening of the hair. As an alternative for this purpose a weak solution of borax is effective in checking putrefaction and for rendering the skins clean and soft. Formic acid is also used in dilute solution for this purpose.

The wetting-out phase of this branch is carried out for from a few hours to several days, depending upon the type of skins under treatment.

Following the soaking operation the skins are "staked," the flesh side drawn across a dull knife edge and then beaten to make them soft and supple.

To facilitate the tanning which comes next, all traces of remaining flesh and fatty substances are removed by means of a fleshing knife. Great care must be exercised in the use of this knife as it is stoned down to a sharp edge and will very easily cut through the leather, thereby rendering the furs less valuable. After a final rinse in cold water the pelts are ready for tanning.

Tanning

Tanning methods are numerous and by the same token are good, bad and indifferent. We shall not attempt to go into all of them but will, to the best of our ability, give an account of the more important processes.

The salt-acid or pickle tan, while by no means the best, claims first mention, being the one most extensively used. It is simple of application and in addition of comparatively little cost. The preparation and manner of application are about as follows. However, the figures and lengths of time given are not adhered to in all cases, since as we now know the many and varied types and qualities of skins would not permit of one formula being used for all:

To 10 gallons of cold water are added one pound of common salt and about five ounces of sulphuric acid, 80 deg. Tw. An earthenware or wooden vessel is advisable owing to the presence of the acid. Organic acids such as acetic, formic and lactic acids may replace the sulphuric in the pickle, and if not thoroughly washed out after the tanning is completed are less apt to injure the leather. Amounts exceeding that of the sulphuric acid by at least four times are necessary, however, and the added cost is, of course, something to be considered.

Skins, the hair of which will not stand immersion for the period of time necessary for a complete tanning, are given the treatment by means of the brush. A few furs requiring this method are caracul, astrachan, Persian lamb and krimmer, all of the sheep family.

The skins are given a generous application of the prepared liquor on the flesh side with a brush and then laid

in piles, flesh sides together, and allowed to remain so until thoroughly tanned. This may be ascertained by observing a cross section of the leather and the action may be deemed complete when the entire thickness of the skins take on a milky white appearance. Depending upon the thickness of the skins the time varies from six to eight hours to a couple of days.

Such skins as will stand the dip-pickle are entered directly into the liquor, agitated occasionally and are usually tanned in from twelve to eighteen hours.

The acid used in the process causes a plumbing or swelling of the skins, thereby allowing the salt to penetrate the separated fibers. The salt also has a tendency to tighten up the individual fibers again and in a sense locks itself within the corium, which is the second or inner layer of the leather.

This pickle tan, while much desired because of its simplicity and inexpensiveness, has one bad disadvantage. If kept dry the skins tanned with this method last indefinitely, though upon coming in contact with moisture putrefaction again sets in until once more dried.

A tannage just a little more complicated and expensive, but one that overcomes the one objection in the salt acid tan is the alum tan. For skins of muskrat, squirrel, the martens, mole, sable and rabbit this alum tannage is extensively used. Varying amounts and styles of application are in use, a typical formula follows:

About three pounds of alum and one pound of common salt are dissolved in ten gallons of water, cooled and strained. The skins are entered, agitated for a while, and kept in the liquor for several hours or until tanned.

When it is desired to keep the hair free of the tannage, the volume of liquor is reduced to about seven gallons to which is added sufficient flour to make a fairly stiff paste. It is then applied to the leather side with a brush. The procedure is the same as with the brush method in the pickle tan.

The dry powder of a mixture made of two parts alum and one of salt may also be rubbed into the wet skins after which they are rolled in pairs, flesh side in, and given the allotted time to tan. Rinsing and air drying finishes the operation.

For special purposes the result obtained with any one of the single tan processes may not be satisfactory, having some particular objectionable feature. Very often this feature is overcome by making use of two and even three of the individual tannages. What is known as a combination tan is thus acquired.

A few of these combined tans are the pickle and chrome tan which may be carried out in one bath or separately as the case may require; pickle formaldehyde together or separately, also chrome-formaldehyde tan.

The pickle-formaldehyde tan in one operation is procured by the simple addition of an amount of formaldehyde equaling that of the acid used and carried out in the usual manner. If for some reason after the pickle tan has been completed the skins are found unsatifactory for the purpose at hand, the formaldehyde-tan may be incorporated by immersing them in a dilute solution of formaldehyde for several hours.

The chrome-formaldehyde tan is brought about by the addition of about one pint of 40 per cent formaldehyde to 20 gallons of chrome liquor, the preparation of which will be taken up next. If desired the formaldehyde may follow the chrome tan in a subsequent bath.

Chrome tan is obtained by immersing the skins for a few hours in a cold 5 per cent solution of chrome alum, then an amount of soda ash, previously dissolved and cooled, equal to one-fourth that of chrome alum is added. The skins are kept moving through the liquor for a while and allowed to stand overnight or for ten to twelve hours longer if necessary to complete the action. Rinsing in cold water, washing in a weak solution of borax and drying at a fairly low temperature finishes the tanning.

Skins tanned by this method are very durable and have great resistance to water—hot and cold—though it requires great care during the process, and the finished leather has a bluish green coloration, which is undesirable in many instances, but comparatively little use is made of it for furs.

An advantage of this tan is its ability to withstand temperatures as high as 160 deg. Fahr. when necessary in dyeing.

Chamois tan or oil tan consists in rubbing into the leather such oxidizable fish oils as cod or whale oil and seal oil. The oil is worked well into the skins several times if necessary, and the skins then hung up for several hours after each application.

A common practice of the American Indian was, and perhaps still is, to tan a skin by rubbing into the flesh side, the brains of the animal from which the pelt was taken.

Some idea of the effectiveness of this "brain curing" may be had by a visit to one of the history museums, and an examination made of the well preserved specimens of the Indian tanners' handiwork found on display.

There are several other processes of tanning used for skins of a delicate nature, a slight knowledge of which is expressed herein. The materials used are rye, bran and barley, etc. The skins are covered with various mixtures of these articles, to which is added some salt solution, and the skins allowed to remain covered with these pastes for a week and sometimes two. Other methods make use of these grain products and are caused to ferment for several days.

Some advantages claimed for these mixtures are a finer, softer leather when finished and have no effect on the hair.

Furs that are to be used in the natural colors are at this point put through one more softening process and beaten to bring out the maximum of fluffiness and beauty of the hair. Also at this stage they are plucked, sheared, or both, as the case may be, before being made up into garments.

(Part II will appear in an early issue)

Stretching Properties of Artificial Silk

THE National Association of Cotton Manufacturers has been carrying on tests to show the stretching properties of viscose and acetate artificial silk under varying degrees of relative humidity. The results have been published in a bulletin, which states that "Keeping the effect of the moisture on the stretch in mind it is very apparent that unless care is taken both in winding and weaving to maintain constant moisture conditions, the rayon yarn will vary in the amount that it is stretched. When rayon yarn is stretched it is reduced in diameter. When rayon yarn that has been stretched varying amounts is used in some types of cloth it will cause many defects, such as thick and thin places, and when dyed, uneven dyeing; the thin spots where the yarn has stretched appearing to be a slightly different shade than where it has not been stretched."

The investigation was carried out by the Bradford Durfee Textile School, with the co-operation of the technical department of the National Association of Cotton Manufacturers. In connection with the text is a chart showing the strength and stretch of the rayon yarns at 45 and 85 per cent relative humidity. That chart shows that at a relative humidity of 45 degrees viscose process yarn was made to stretch 13½ per cent before the breaking point was reached. The test is described as follows:

"After exposure to a relative humidity of 45 per cent at a temperature of 70 deg. Fahr. for four hours the viscose type yarn, when tested in a breaking strength machine equipped with an autographic recorder, stretched at a fairly uniform rate until a load of about 44 pounds had been applied. The stretch at this point was about 3.9 per cent. Further load caused a very decided change in the slope of the curve indicating that the yield point had been reached although there was no rupture until a load of about 56 pounds had been applied and the stretch had increased to about 13½ per cent. Samples from the same skein after exposure to a relative humidity of 85 per cent at 70 deg. Fahr. when tested showed quite different properties. The yield point was reached at a load of about 10 pounds with an elongation of about 2 per cent, and the rupture point was reached when a load of about 35 pounds and an elongation of about 19 per cent had been reached. The acetate yarn when exposed and tested under similar conditions gave somewhat similar results although the additional moisture had less effect on both the strength and stretch."—Textile Argus.

OVERLOADING DYE KETTLES

It is a mistake to overload dye kettles. As a rule, dye kettles of whatever type or construction are built to accommodate a certain definite amount of material, and to exceed the rated capacity of the kettle tends to invite troubles that prove difficult to rectify later.

A piece-goods kettle rated to handle comfortably, say, eight pieces cannot be expected to show its best results if it is continually operated with twelve pieces. The same remark applies with even greater force to rotary dyeing machines used for hosiery. It is not infrequently noticed that machines built for 200 pounds are often loaded with batches greatly in excess of the rated capacity, which, consequently, proportionately reduces the amount of dye liquor, and prevents the proper floating of the hosiery in the dye liquor, a condition that does more to cause uneven dyeing results than anything else.

By all means have sufficient dye liquor to float the goods in freely, even though the output per machine or kettle may not be as great as if the capacity were filled to the limit.—Dyestuffs.

NORTH CAROLINA TEXTILE SCHOOL STUDENTS VISIT MILLS

The policy of the Textile School of the North Carolina State College is to have the senior students make periodical visits during the year to cotton manufacturing plants in the State so as to become familiar with the actual operations of the mill.

The second of these trips was made recently by the senior students in textile manufacturing and textile chemistry and design, visiting, first the Erwin Cotton Mills, Durham, N. C. They were conducted through the mill by P. B. Parks, general manager, and J. H. Haddock, a graduate of the Textile School, Class of 1915, in charge of the Research and Efficiency Departments of the mills.

From Durham the party went to Roxboro and visited the plush mills of A. T. Baker & Co.; also the Longhurst Cotton Mills. Here the party was conducted through the mill by another graduate of the Textile School, Mason Thomas, class of 1925, who is overseer of winding and twisting.

F. Gordon Cobb, secretary of the Southern Textile Association, and general manager of the Lancaster Cotton Mills, Lancaster, S. C., addressed the textile students of the North Carolina State College previous to the meeting of the Spinners' Section of the Southen Textile Assotion.

Marshall Dilling, a former president of the association, also addressed the students.

Mr. Cobb has several State College textile graduates in his employ, and also has a son taking the textile manufacturing course at the school.

Installation of machinery in the new plant of the Belmont Processing Company, Belmont, N. C., which will mercerize, bleach and dye single and ply yarns up to 100s, has been started, as the work on the buildings and village is practically complete.

American Yarn & Processing Company, of Mount Holly, N. C., has completed installation of a new warp mercerizing range and complementary equipment which will double its production of mercerized yarns.

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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JANUARY MEETING OF THE NEW YORK SECTION

The January meeting of the New York Section of the American Association of Textile Chemists and Colorists was held at the Elmwood Country Club, Paterson, N. J., Friday evening, January 22, 1926.

Through the courtesy of P. J. Wood, vice-president and general manager of the Oriental Silk Printing Company at Haledon, N. J., an invitation to visit this plant on the afternoon preceding the meeting was extended to members of the section. Some seventy members and guests accepted this invitation and were conducted by Mr. Wood and other officials of the company through all departments of the Oriental plant, beginning with the arrival of the silk in the gray and following it through all processes until it reached the shipping room. This trip was extremely instructive and was greatly appreciated by all present.

An informal dinner was served at the Elmwood Country Club at 6.45 P. M. which was attended by 154 members and guests, additional late comers swelling the entire attendance to upward of 175.

The speakers of the meeting and their subjects included, "Throwing As Related to Piece Dye Silks," by L. C. Lewis, of the Neutrasol Products Company; "Practical Aspects of Weighting and the Dyeing of Weighted Silk Piece Goods," by Carl A. Puller, of the Ciba Company, and "The Dyeing and Finishing of Silks from the Consumer's Standpoint," by P. V. Bouterse of L. Bamberger & Co., Newark, N. J.

All of these papers, together with the discussions following same, are published in full herewith.

Respectfully submited,
DANIEL P. KNOWLAND, Secretary.

When the routine business of the Section had been transacted, Chairman Grandage opened the evening's program:

Chairman Grandage—I have talked with quite a number of the gentlemen present, all of whom said that the trip this afternoon was well worth the time expended for it. I will entertain a motion at the present time, if someone will make it, for a rising vote of thanks to Mr. Wood, former Chairman of the New York Section, who arranged for the trip and for this meeting here to-night. . . . It was unanimously voted, upon motion regularly made and seconded, that Mr. P. J. Wood be extended a rising vote of thanks. (Applause.) . . .

Chairman Grandage—We have another good Paterson man, a former chairman of the New York Section, who has done a great deal to make this meeting to-night a success: Mr. Lotte. Mr. Lotte has contributed not only a great deal of time and effort to make this meeting a success, but I understand he has contributed other things that meant real money to him, this afternoon. I will entertain a motion for a rising vote of thanks to Mr. Lotte.

A. P. Howes—Mr. Chairman, I would like to say that I, personally, as Chairman of the Program Committee, realize the extent to which Mr. Lotte has gone in trying to make this meeting a real success. You owe all thanks to Mr. Lotte for whatever you have here to-night. He has run the entire thing. He hired, at his own expense,

the buses that took you over to the Oriental Silk Printing Company this afternoon. Mr. Lotte likes to remain in the background but the entire success of this meeting is due to Mr. Lotte and you should give him a real rousing vote of thanks.

. . . Mr. Lotte was extended a rising vote of thanks by the members. . . . (Applause.)

Chairman Grandage—Our first paper to-night will be presented by Mr. L. C. Lewis, former Secretary of the New York Section. The subject he has chosen for the paper is, "Throwing As Related to Piece Dye Silks." I think you are all familiar with Mr. Lewis so he really needs no introduction.

Mr. Lewis! (Applause.)

Throwing As Related to Piece Dye Silks

By L. C. Lewis
Neutrasol Products Corporation

You all know that raw silk comes from three principal sources: Japan, China and Italy. A large percentage comes from Japan—about 85 per cent—the balance coming from China and Italy. At the present time we get very little Italian silk over here; it is nearly all consumed by France, Germany and England.

The silk is reeled in Japan, sent to the conditioning house, where it is baled, and tested, and then sent across by very fast steamers to Seattle or San Francisco, and then by fast trains to New York. The last shipment that came over was valued at $10,000,000 and made the journey in ten days. I think that is the record.

When the silk gets to New York it goes to the storehouses and from there it is sold. Sample books are very often taken out and sent to different manufacturers for testing purposes. If they are accepted, the silk is sent to the throwing or weaving plant.

When the silk comes to the throwing plant, the first operation is weighing the bales and soaking the silk. There are about 130 pounds in a bale of silk. A bale of silk contains about thirty books and a book contains thirty skeins. The skeins are opened up and put in bundles of ten or fifteen, tied at both ends, and are then ready for the soaking bath.

The soaking of raw silk is the most important part of the manufacture of silk. I believe more silk is spoiled by soaking than by any other operation in the entire process of silk manufacture. Various methods are used for soaking, after the water is prepared. The bath is usually prepared by making an emulsion with a good grade of neutral soap and a pure saponifiable oil such as olive oil or neatsfoot oil. A new type of oil called Neutrasol has recently been put on the market which, when added to a bath containing a mild alkali, will form an emulsion similar to that produced with soap and oil. (A bottle of this product was passed around for inspection.)

Silk is soaked from two hours to overnight. For tram, two hours is plenty; for soft mixtured organzine, four hours; for hard natured, six hours; for crepe, nearly all manufacturers soak it all night, but nearly all manufacturers at the present time soak their silk too much. They should cut down on their soaking. That is the cause of hairy silk, split ends, and any number of troubles which manufacturers have.

After the silk is soaked properly, it is whizzed. The whizzing is also very important. In order to get the proper weight, you must whiz for the proper length of time, anywhere from three to five minutes in ordinary practice.

After the silk is whizzed, it goes to the winding department and is hung up on poles directly above the winding frames. It is left there for several hours to dry thoroughly. All silk should be dried before it is wound. That is another cause of trouble. If the silk is wound wet, the bottom of the bobbin is wet and the top dry, thereby causing unequal expansion and contraction of the thread, which causes corkscrews in organzine and slack twist in crepe.

There are various methods of putting in the twist, four or five, I believe. Some put in on the first time spinner three turns, then twenty turns, then finally forty turns for a sixty or sixty-five turn crepe. Others put in on the first turn thirty twists, and the second time thirty twists. Still others put in fifteen twists on the first time and forty-five or fifty on the second time.

Usually the crepe is finished on galvanized iron head bobbins. They use copper, galvanized iron, and aluminum, but copper and aluminum are very expensive and galvanized iron is the most common bobbin that is used.

When the crepe bobbin is finished, the twists should be set by soaking in either plain water or in some mild solution. There are several methods of setting the twists. I think the very best is by steaming, putting in a steam box at low pressure for fifteen minutes, and then shutting the steam off and allowing it to cool, and then in about ten or fiteen minutes giving it five or ten minutes more. As I say, there are various methods of setting the twist; some use ten minutes' steaming and ten minutes between the different steamings. A great many of the throwsters use what they call the cold water method of setting the twist. The iron head bobbins are put in cold water and left there overnight, and the next morning are taken out and whizzed and dried, either in the open air or in specially prepared drying rooms. Then the iron head bobbins are redrawn onto fiber head spools or wooden spools and are ready for the quill winders, or the warpers. The warpers put the silk on warp beams and from there go to the loom and are woven.

For Georgette crepe, they use crepe in both the warp and the filling. For crepe de Chine they use raw silk at twenty or twenty-two deniers for the warp and crepe

thread for the filling. Of course, all the different goods that are manufactured use different yarns, raw sometimes in the warp and crepe in the filling.

I have here a white Japanese skein and a yellow Japanese skein. You might pass them around, if you care to. Here are a couple of the cocoons from which the silk is made. These cocoons contain between five and six hundred yards of silk. They are softened and reeled in the filatures in Japan.

I have here a piece of the raw crepe as it appears before it is sent to the piece goods dye to be weighted and dyed.

That gives you a general idea of the manufacturing of piece dyed goods. Would anybody like to ask questions? I will be very glad to answer them if I can.

Discussion of Throwing as Related to Piece Dye Silks

E. F. L. Lotte—Mr. Lewis, you spoke about the defects being caused by soaking more than anything else. Would it be possible to find those defects in the woven crepe or Georgette before it was boiled off? It would be interesting to the dyer to be able to detect that.

Mr. Lewis—For example, the soaking will make split ends. Split ends are very troublesome. It will make hairy silk, if it isn't soaked properly. The curse of silk manufacturing is hairy silk; it causes trouble in warping; it causes white specks in the finished goods, and other things that are hard to overcome.

Soaking is a matter that has not been gone into very extensively and there is a big field here for research work, and it is one of the causes, in my opinion, of so much trouble in the silk business.

I don't know just why soap was used originally, but probably for weighting purposes. If a throwster or a manufacturer can sell soap at seven or eight dollars a pound that only costs him ten cents, of course, he is making money.

Does that answer your question, Mr. Lotte?

Mr. Lotte—To some extent.

Mr. Lewis—Of course, a lot of defects are caused in the throwing. Corkscrews can be made in organzine by poor throwing; slack twist in organzine and crepe can be made by poor throwing. A great deal of the trouble can be caused right in the throwing plant. I have been going through some plants recently and from what I have seen, I have come to the conclusion that a manufacturer, or an expert, ought to be very careful before he says that a certain thing is caused by a certain other thing because the silk goes through so many operations that there are a dozen places where the trouble might happen. The manufacturer blames the dyer and the dyer blames the throwster; the throwster blames the soaking and the soaking man blames the raw silk—and that is the way it goes. Silk is so expensive that it should be handled in the very best possible way. At the present time it costs seven dollars a pound and you can't handle it too carefully. Some manufacturers handle it as if it costs less than cotton.

Albert Furman—Which method do you consider the best to handle the skeins in soaking: to wrap them up in bags or to leave loose in skeins, tied up?

Mr. Lewis—To get a good penetration of the emulsion through the silk, the skeins should be opened up. If the skeins are left in bags, the outside of the skein will have 22 or 23 per cent boil-off and the inside skein will have 19 per cent boil-off, which is the boil-off in the raw.

Mr. Furman—This is soaking it in the raw, not boiling it off.

Mr. Lewis—Yes, I understood you.

Mr. Furman—And those bags are very loose, regular hosiery bags.

Mr. Lewis—But they don't penetrate uniformly through the skein, if they are put in bags. The reason they are put in bags is that they are very much more convenient to handle that way in the winding department. Of course, the more you handle the skein, the more breaks you get. The idea is to handle it as little as you possibly can so as to make as few breaks as possible.

For organzine, I think it is all right to use the bags, but for crepe you should never use bags. The silk ought to be opened and put in small bundles before soaking.

Another cause of trouble is hard water. I had a case to-day where it was practically impossible to make an emulsion on account of the hard water. The water should be as soft as possible; permutized water is the very best. Paterson water is four degrees hardness, which makes a very good emulsion, but anything harder than that causes all kinds of troubles. Calcium and magnesium soaps are formed. They stick to the silk and go through into the gum soap and then the dyer uses this gum soap in his dyeing. That causes trouble in the warping and in the weaving.

Mr. Castle—Mr. Lewis, just put me right on this: As I understand it, the function of the soap in the raw state is twofold. One is to soften the sericin or silk gum, and the other to lubricate for rapid operation of throwing. Can you say just how that harms the silk?

Mr. Lewis—Soap goes on the fiber and forms a crust after it is dried, which kills the fundamental idea of soaking. The fundamental idea of soaking is to simply put a lubricant or emulsion on the thread so that it will wind and spin properly.

The only reason why manufacturers use soap, that I can see, is to get weighting.

Mr. Seiter—What do you mean when you say "weighting"? I noticed you mentioned that word several times, and it is difficult for me to understand what you mean when you say "weighting."

Mr. Lewis—Soap goes on the silk thread and adds weight to the thread.

Mr. Seiter—Do you connect that in any way with tin weighting?

Mr. Lewis—No, that is an entirely different proposition. This that I am speaking about is weighting in the raw silk.

Mr. Seiter—Before you asked for questions on this subject, you mentioned that you had a piece of goods that was ready to be weighted. I presume you meant to be piece dyed, or did you have a different meaning in your mind when you said that?

Mr. Lewis—That piece which I had here was a piece of finished crepe which was all ready for the stripping and the weighting in the piece dye shop. Here is a piece of crepe which is woven raw. This has probably about 25 per cent boil-off; that is probably weighted with soap and oil. That, of course, is stripped by the dyer, washed, and then goes to the tin weighting process.

Mr. Seiter—That is what I wanted to know: whether you had in your mind tin weighting when you said "weighting."

Mr. Lewis—No, I didn't—

Mr. Seiter—Of course, we don't specify weighting unless it is tin weighting. Why should you use that word "weighting"?

Mr. Lewis—This is weighting in the raw stock that I am referring to. I think you will probably hear more about this tin weighting, which is an entirely different proposition, later.

Mr. Ecker—Mr. Lewis mentioned something about the silk becoming somewhat fuzzed and hairy in subsequent operations after soaking. May I ask Mr. Lewis is that condition did not come from an alkaline condition in the soaking bath?

Mr. Lewis—Yes, I think it did.

Mr. Ecker—Where would the alkaline condition form?

Mr. Lewis—If soap were used, it would be right in the soap emulsion.

Mr. Ecker—That is, the alkali in the soap would be set free in the water. Is that what you mean?

Mr. Lewis—An emulsion made with soap, unless it is made absolutely correctly with the proper amount of soap is usually on the alkaline side. You can make an emulsion, if you are very careful, with soap and oil and get it pretty nearly neutral, but with crepe it would be impossible because you would have to use so much soap to get 25 per cent boil-off, that I think all the emulsions are on the alkaline side. All emulsions, with the proper water, should be as nearly neutral as possible. Of course, with hosiery, the bath is always alkaline because in hosiery they use a large amount of alkali to make the thread nice and soft.

Mr. Ecker—That particular condition would cause the silk to be hairy, would it not, in subsequent operations?

Mr. Lewis—Yes, it would.

Mr. Ecker—Thank you very much.

E. F. L. Lotte—Mr. Lewis, you spoke of the yarn rotting. Do crepes deteriorate after they are woven? I appreciate that the crepe twist does deteriorate if it is not woven up within a reasonable time; that is, they oughtn't to carry it over three or four months, ought they?

Mr. Lewis—Very seldom, I think.

Mr. Lotte—On account of deterioration, isn't that so?

Mr. Lewis—Yes.

Mr. Lotte—After it is woven, do you know whether there is any deterioration or not?

Mr. Lewis—There is some deterioration. Raw silk, by itself, will deteriorate in cohesion about one per cent a day.

Mr. Lotte—I appreciate that, but as a general rule manufacturers weave raw silk up into crepe and they sometimes keep it for six months, a year, or two years, and sometimes longer. There is a deterioration there, don't you think so?

Mr. Lewis—I certainly do. The silk fiber continually deteriorates.

Mr. Lotte—If the dyer had trouble, it would be worth his while then to find out how far back that was woven, wouldn't it?

Mr. Lewis—It certainly would. It is the business of the manufacturer and of the dyer to know how silk is soaked. If a man buys one hundred bales of raw silk, which runs up into the thousands of dollars, and he sends it to the throwster and the throwster puts on some kind of oil that spoils his silk, the manufacturer should know how the silk was soaked and how it was manufactured.

Mr. Lotte—And how long it has been lying around?

Mr. Lewis—Yes.

I know of one concern that soaked with a certain oil. Hard times came along and they put the goods on the shelves for three or four months and the goods practically rotted away. It cost them about $60,000, because they used a certain grade of oil.

Charles Lotte—If silk in the raw state, before it reaches the throwster, is reeled in Japan, there is a certain amount of deterioration, isn't there?

Mr. Lewis—Yes, sir. My experience has been in the laboratory, and I haven't carried it along very far, but in one month there will be a depreciation in the cohesion of one per cent a day.

Charles Lotte—That is natural deterioration?

Mr. Lewis—Yes.

Charles Lotte—That was the trouble with Italian silk during the war, too, wasn't it?

Mr. Lewis—Yes, Italian silk and also Japanese silk.

E. F. L. Lotte—Referring to the question asked by a previous speaker, isn't it true that oil acts largely on the

sericin and the deterioration of raw silk, therefore, is much quicker than boiled-off silk? I think a number of experiments made by the conditioning house some years ago showed that the deterioration of raw silk was very much more rapid. They gave certain reasons for piling and so on, showing that there is a sort of germ in raw silk which causes that deterioration, and you can't have the same deterioration in dyed silk or wool-and-silk that has been emulsified as you would have in raw silk. I think that is correct, isn't it?

Mr. Lewis—I can't answer that question, Mr. Lotte. I don't know how that would work out. The sericin, as you all know, is the gum on the outside of the thread. That is put there as a protective coating to the fibroin. Silk is composed of two substances: fibroin and sericin. The sericin is there to the extent of about 20 per cent on Japanese silk and 22 or 23 on Italian silk. The fibroin is very weak in substance and you cannot spin it at all. Of course, the very best way to manufacture silk, and in fact the way it was manufactured in France for years, is to simply throw it raw or throw it bright as they call it. The reason we soak it in this country is on account of the high speed in our throwing departments, running sometimes as high as 10,000 revolutions per minute.

E. F. L. Lotte—You get a fungus growth much quicker in raw silk than in boiled-off silk, isn't that correct?

Mr. Lewis—I think you would.

Mr. Lotte—That is the cause of deterioration where oil is present.

Mr. Hunziker—What is your opinion on the use of mineral oil compounds in soaking silks?

Mr. Lewis—Mineral oil is one of the very worst things that you can use in soaking raw silk. It is very hard to strip. The dyer very often has to boil it a long time and use chemicals in getting the mineral oil out. The dyers' association at the present time is trying to put through a resolution that will make it not responsible for any silk that is soaked with mineral oils.

Mr. Hunziker—There have been salesmen coming around claiming that a certain percentage of mineral oil in a compound is very beneficial and very good for the throwster. From the standpoint of the dyer, of course, we are absolutely against it because we must have a compound which saponifies and which is removable in the boiling-off process.

Mr. Berman—I would like to have your opinion on this question, Mr. Lewis: Is it possible for silk to become stiff which has been previously thrown with a combination of neatsfoot and mineral oil?

Mr. Lewis—Yes, I think the thread would be stiff because you would have to use soap, and soap forms a crust on the outside of the thread when it is dry.

Chairman Grandage—Gentlemen, I hate to stop this very lively discussion on this particular paper but we have two other papers to present before our program is completed. Our next paper will be presented by Mr. Carl A. Puller, of the Ciba Company. Mr. Puller will address us on "Practical Aspects of Weighting and the Dyeing of Weighted Silk Piece Goods." Mr. Puller!

Carl A. Puller—Gentlemen: After my friend Mr. Howes had combed the entire local territory in an unsuccessful effort to find someone willing to address this critical audience on the subject of tin weighting he happened to catch me at a weak moment and asked me to accept this assignment, which, with considerable reluctance, I consented to do

I trust you understand that I am not able to give you chemical formulas such as would be the case with a technically trained chemist who had years of experience in tin weighting, and I wish here to apologize for any errors which I may make.

The paper which I am about to read is based on information which has come to me through rather close association with those who are successfully carrying on the process of tin weighting here in America and through some personal friends of mine abroad. The weighting of silk, of course, was originally a European process and was carried on for a long time on skein yarn before piece weighting was attempted, and the original process provided for weighting the fiber in the raw or gum state. To-day, of course, this method has become antiquated and the silk is now boiled off before weighting.

Before beginning my prepared paper I might mention that I am quite sure that the first tin phosphate silicate process was brought to the United States by an old friend of mine, E. H. Bosshardt, about 1895, and submitted by him to the Weidmann Silk Dyeing Company. This, of course, was skein weighting and not piece weighting.

Practical Aspects of Weighting and the Dyeing of Weighted Silk Piece Goods

By Carl A. Puller,
Ciba Company

At the present time the silk manufacturer is confronted with a problem that has affected the whole silk industry in a comparatively short time, the weighting of silk in the piece.

There has been much said about the subject, many people are very enthusiastic about it, a great number quite pessimistic.

Silk has been weighted in the piece in Europe for fifteen years, a fact that strongly endorses the process and which defeats objections arising from many sources that such a process cannot last.

The process has been carried on in the United States for about ten years and then only to a very limited degree. However, it is only in the past year that there has been such an enormous demand for weighted goods. This demand has resulted in rapid adoption of the process by the silk dyers.

When the weighting process was first introduced it was considered an adulteration, in other words, a detriment to the quality and the value of the product. Today, with the improved methods, the positive control and the proven success of the process it is considered an asset. This naturally applies only to the cases where it is done properly and within reasonable limits. This explains why Europe, which incidentally is not enjoying the vast prosperity that this country is, has adopted this method for 80 per cent of the silk converted, thereby greatly increasing the money value of the fabric both for the manufacturer and for the consumer.

Historical Developments

It may be of interest to hear first about the historical developments of the weighting of silk. The first experiments were very primitive indeed. They were carried out with such substances as sugar, magnesium chloride, etc., by soaking the silk in such solutions. These was, however, nothing to fix these substances on the silk. This is the principal difference between this kind of weighting and the present one where there is a real chemical affinity between the fiber and the ingredients used for the weighting.

About 1870 to 1880, weighting with Gambier and Sumac became very important. This was a stepping stone to the waterproof and washproof weighting of the present time as this chemical matter has a certain chemical affinity for the silk. This affinity is limited, however, and consequently the weighting was not absolutely waterproof. The disadvantage of this process was the brownish tint left by the tannins. This made the production of light shades almost impossible for the dyer. In the same decade the weighting with tungsten was discovered. This method, however, gave only 5 to 10 per cent weight and was very expensive.

The year 1880 was the beginning of a new epoch for the silk industry, marked by the discovery of tin weighting. The first so-called "pink salt" was a combination of tin-chloride and ammoniumchloride. Later it became tin-tetrachloride as it is used at the present time. The silk was soaked for sixty to ninety minutes in a solution of 20 to 30 deg. Be. After this operation, it was washed thoroughly and in order to neutralize the last traces of free hydrochloric acid it was treated in a soda or soap solution. By repeating this procedure every increase in weight was greater than the preceding one. This meant then, that a method for weighting the silk to an unlimited amount (theoretically at least) had been discovered. Practice soon proved that weighting by this method, even moderately, affected the silk very seriously. Stored away, especially under the influence of light, the fiber lost its strength and elasticity. This was due to the fact that tin-oxide, which is chemically not inactive, reacted under the influence of the atmosphere and seriously injured the fiber. Recognizing this fact, the next problem was to find a way to make this tin-oxide inactive.

A combination of the methods of weighting with tin and with the above-mentioned tanning materials was discovered to be the solution of this problem. After treating the tin weighted silk with Sumac and Gambier the tin-oxide was changed into a tin-tanate which is a chemically inactive compound. But this method had one of the disadvantages of the former with tanning materials in that the silk became badly tinted and could not be dyed in light shades. Almost the same year brought about the completion of the tin-weighting processes, the tin-phosphate, and the tin-phosphate silicate weighting which is the important one up to the present time. The phosphate changes the tin-oxide into an inactive tin-phosphate which increases the weight at the same time, while the silicate which combines with the tin-phosphate making an additional reaction possesses this quality to a still greater degree. As it swells the fiber considerably, it gives to the silk a very good appearance.

The Weighting Process

The weighting process roughly is as follows: Weighting, washing, phosphating and washing. The number of passes depends upon the weight desired. The procedure of weighting and silk pieces is as follows: They must be first boiled off in the proper way. They are then impregnated with tin-tetra chloride. This can be done by soaking the silk in a standing solution in an ordinary box or can be done in a rubber lined whizz. There are different opinions regarding the advantages and the disadvantages of these two methods. If the goods are soaked in a standing solution, some parts of the silk may not come in actual contact with the liquor. In the extractor penetration is much more thorough because the goods are slowly revolved in the liquor, which is kept in continuous circulation by means of a suitable pump. The latter method gives a greater production because the surplus tin, after the reaction is completed, can be extracted by revolving the whizz at high speed. This naturally saves an operation because after the goods are removed from the standing solution, they must necessarily be extracted. The way in which the goods are packed into the tin extractor is very important. The pieces, in suitable coverings, should be placed against the side of the basket.

The next operation is the washing, which is usually done in the rope form, and which must be done very thoroughly. The machine best suited for this washing operation is equipped with a set of nozzles through which the goods pass in rope form. Water at high velocity is forced from the sides into the center of the nozzle, thereby thoroughly removing all of the surplus tin. The

mechanical part of this operation, that is the machine itself, is a very important factor.

The next operation is the phosphating. This can be done in a phosphate machine similar in construction and in operation to the washing machine or it can be done in the whizz. Here there are again different opinions regarding the relative advantages. The goods must then be again washed. The phosphate washing machine is identical with that of the tin washing but, in addition, the goods are passed through a compartment containing a weak solution of acid to neutralize all possible traces of phosphate.

When this cycle of operations is repeated the conditions are not exactly the same as in the first pass; they are changed for each successive pass. Certain goods for certain results are silicated. This silicate pass will add approximately the same weight as the tin and phosphate pass.

After the weighting operation is complete the goods are brought into the dyehouse and it is for the dyer to decide what dyestuffs are to be used to produce the required shade. In his choice of dyestuffs it is most important that the dyer bear in mind that the finished pieces must show identically the same color under both daylight and artificial light.

For dyeing tin weighted piece goods with direct colors I recommend, from practical experience, the following formula:

To the dye bath are added:

10 per cent Monopole Oil
10 per cent Phosphate of Soda
10 per cent Acetic Acid

The bath is then brought up to about 120 deg. Fahr and the goods thoroughly wet out in this solution before the addition of the necessary dyestuff.

For basic and acid colors I recommend a prior addition to the bath of 5 per cent Monopole oil and 3½ per cent formic acid, in which solution the goods are thoroughly wet out before adding the required dyestuff. The temperature of the bath should not be allowed to exceed 190 deg. Fahr.

It is very essential that the pieces be brought up to shade as quickly as possible in order to eliminate shade marks. Black dyeing is done in the usual way by the use of oxidized and unoxidized logwood. Both of these products will add considerably to the weight of the fabric as well as to the bloom of the color.

After dyeing, the goods should be washed thoroughly in one cold water and brightened in the usual manner. The finishing of tin weighted piece goods is quite different from the finishing of pure dye silks and does not require as much sizing as the pure dye.

The continual demand for more weight would possibly tempt some dyers to exceed the reasonable limit. This is particularly dangerous because when this overweighted material is first finished it may have the appearance of being perfect but grave consequences are bound to result.

In general it might be said that the tin weighting process is confronted with great difficulties. The mechanical procedure and more especially the chemical control is of utmost importance. Temperatures, concentrations, acidities and alkalinities of the different baths, the temperatures, the hardnesses or the acidities of the washing waters all affect the weighting process. It is the task of the chemist to follow and scientifically study these various influences with the greatest care. There is no question but that tin weighting is strictly a chemist's job and to use the slang expression it must be one who "knows his business." It might be well to mention, too, that the success or failure depends largely upon the manufacturer of the silk. He should, by suitable construction of his merchandise, assist the dyer who is required to shoulder all of the responsibility.

Mr. Puller—I cannot answer any chemical questions because I never was a chemist and never will be, but I will do my best to answer any practical questions that may be asked. (Applause.)

Chairman Grandage—Are there any questions that you wish to ask Mr. Puller? Mr. Puller has one good foot. Be as careful as you can with the other one, which is pretty bad. (Laughter.)

Probably more important than how to dye or how to weight silk, or just how it should be properly done, is the matter that is to be taken up in our next paper. After all, all that concerns us in the dyehouse or that concerns us in any other part of the mill is what the consumer thinks of the job we have done when we have finished it.

Mr. P. V. Bouterse, silk buyer for L. Bamberger & Co., Newark, one of America's greatest stores, is going to present for us the subject of "The Dyeing and Finishing of Silk from the Consumer's Standpoint." Mr. Bouterse! (Applause.)

The Dyeing and Finishing of Silk from the Consumer's Standpoint

By Peter V. Bouterse,
L. Bamberger & Co.

I am going to sign off very early, so don't get worried about the bus or anything else. I don't want to pull any of these stalls, either, about getting out to answer telephone calls.

I have one or two things I want to tell you fellows and I don't know whether you are going to like it. This temptation Mr. Puller has been talking about has been succumbed to too "dog-gone" often: overweighting of silk. If you fellows want to kill the goose that laid the

golden egg, keep on going the way you have been going and the rayon business will put you out of business in ten years.

I am going to have the doubtful pleasure in a few days of going to Europe to buy silks. One wonderful thing, I have found, about those "frogs" over there is that regardless of how nicely they put it over on you, you can't prove it. (Laughter.) They make you like it. But they absolutely don't try to "bull" you into believing they are giving you anything but style, and you are perfectly willing to pay for it. In America, the American manufacturer has captured the domestic market through his ability, first, to undersell, because of the Republican Party (laughter); second, because he has been able to produce an article of real merit. We do make very wonderful silks in this country.

Here comes the dirty work. (Laughter.) Some little shyster down on Fourth Avenue tells his broker that he must have silk, and, of course, he must "render therefore unto Cæsar the things which are Cæsar's," and sometimes it is Peter Bouterse's, or someone else's, but he has to get silk and he isn't very particular where he gets it, and if some "Jap" has stuff that is a couple of years old and he can come in to one of these silk buyers in Newark and undersell to the amount of ten cents, why, he gets away with it.

Wait a minute, now! Don't all speak at once. You will say that is the fault of the buyer. We are constantly pounding you fellows over the head to bring out something cheaper, and cheaper, and cheaper.

That day, however, is very rapidly passing into history. All of the reputable organizations in America to-day, the big groups of stores, such as the Retail Research Association (to which we happen to belong), and the other groups of specialty shops and department stores, are beginning to realize that they must talk quality to the American woman, because she is a pretty good judge of it. If you don't think so, just look at yourself when you shave in the morning. (Laughter.)

We are dealing with something, men, that is closer to a woman's soul than her skin (laughter), and that is silk. I might orate about the wonderful things that a woman can do, and, feel, and believe, and think, and dream when she is surrounded by the rustle of silk, and I could paint some very beautiful pictures of the appetites and the luxuries and all the things we think of when we think of silk.

Silk is really the queen of all the fibers and some of you manufacturers are rapidly making a prostitute out of her. I mean that seriously.

There is a very decided trend to-day in the department stores of this country. I have the doubtful honor of being the chairman of a silk buying group of eighteen stores representing a retail business of $35,000,000 in silks alone. On over-the-counter silks for the first ten months of 1925, the figures are just coming through now. We have sold over $15,000,000 worth of silks over the counter in the Retail Research Association stores. That does not take into account the silk sold in the fur repair departments, the art needlework departments, the drapery departments, the lace and embroidery departments, and Lord knows they have enough other places around the store where they sell silk—especially after I get a good big heavy stock.

But quality is going to spell either silk business or some other business and Paterson is very much interested in the silk business. If Paterson wants to keep on the map in the silk business, she had better guard her reputation or have three or four first-class funerals. (Laughter.)

When a woman buys a silk dress from a store that is backed by years and years of local reputation and we find that the silk is not up to standard and does not give good service, we are going to find out who made that silk and where the mill is located, and that mill will go on our black list.

Gentlemen, the washability of a piece of silk, worm silk, is going to determine whether or not the rayon industry in ten years from to-day is going to crowd the worm silk business off the map.

You have an industry created by men in your profession, by chemists, and you have positively created a Frankenstein unless you control it.

What is it? This is a question; this is not a statement. I really want to know—that rayon will not do for a garment that weighting will do for a piece of silk? It gives luster. We have the elasticity of the new viscose yarns, such as Celanese that is coming out of England. The draping quality of the rayon yarn is being very rapidly improved upon. If you are simply going to create style, and nothing but style, you might just as well put rayon mills up on these lots and tear down your old silk mills.

The American woman to-day is living more like the Englishwoman than she has for a great many years. The American woman to-day is driving around in an automobile; she is not sitting in a little Dolly Varden frock on a horsehair sofa in the parlor. I have to date my wife up a week in advance if I want to find her home. (Laughter.) And she is typical of the whole group of modern young people. She would love to hear me say that—"young people." (Laughter.)

I want to tell the "cockeyed world" (laughter), gentlemen, that if you are really going to make silks for looks —I want to repeat it—you are going to go out of the worm silk business into some substitute.

You have all of the respect and admiration, and the experience of centuries behind you in the silk business. I think you have all read Samuel Merwin's book, "Silk." It is a novel. It is a Chinese love story and it is a very beautiful thing. You would all like it if you read it. It

is about the fellow who finally got the fairy princess, and it has a great deal of romance woven into it. It is a story of the early days of the silk industry. Let's live up to that. Let's keep silk in the class where it belongs, as one of the delicacies, one of the luxuries, one of the beautiful things of our civilization. Let's try to build it up, and you chemists, instead of trying to figure out ways of putting more tin on the woman's back (laughter), go home and sit up nights and try to figure out how you can get a dye that will actually stand washing the chocolate soda water out of the woman's dress after she spills it on. (Laughter and applause.)

This comes pretty close to home. My wife is dieting, like most of the women, and she spilled some orangeade or some fool drink or other on her dress and it ruined a very good $69.50 dress—Bamberger's, third floor; take the elevator around to the left. (Laughter.) We paid five dollars to some quack dry-cleaner to ruin it still more.

That is the job you have before you. If you fellows will solve that problem the women will build statues to you. (Laughter.) They certainly will.

The American woman is vitally interested in a piece of real silk that will wash. Mr. Puller tells me it is not necessary to make a pure dye silk to make it washable. God help the man who tries to sell a weighted silk in my department and tell the customer that it is washable! He will lose his job so quick—but, anyway, if you will tell me how I can get a weighted silk that will wash, I will thank you. I mean that seriously. So far we have not been able to find any such thing.

I made some notes and I have them here somewhere, although I can't find the dog-gone things. To be very formal a man should always say, "Ladies and Gentlemen," and all that sort of stuff. I should start all that and say, "It is a pleasure to be here"—it isn't a pleasure. I had a night off and this fellow Howes had such a nice voice over the phone and wrote such a nice letter that the superintendent's office said, "Yes, you better go out there. We are having a lot of trouble with adjustments lately about rotten dyes. Maybe you can put something across that will help the business." So that is why I am here. (Laughter.)

I just want to see if there is anything in these notes that I haven't talked about. Generally, when I get home I find my notes in my pocket, look them over and say, "That is a good point I should have talked about."

Here is something I made a note on: Shall we have style without quality? That is a beautiful point. Imagine the oration I could make on that: Style without quality! We are not going to talk about that at all.

The growing demand for washable silks—I have talked about that, haven't I?

Here is a very good point: The consumer doesn't give a hoot whether we consider her a problem or not. She wants what she wants when she wants it. Laugh that one off, if you are in the merchandising business. She generally wants what we don't want her to have, what we haven't got.

Gentlemen, I want to come back to washable silks again. I want to pound that home once more. The women want silks that will stand up under modern conditions. The price of laundering, the cost of dry-cleaning, and many other things that enter into modern life to-day, particularly in the big city, absolutely point the way to an increasing use of washable silks. I can't repeat that often enough. The business on washable silks in Bamberger's store during the past two years has been about nine times greater than it was three years ago, in advertised lines, such as Truhu, Darbrook Stripes, Empire shirting silks, plain-colored broadcloths and all that sort of stuff.

If you will give them what they want you will become rich. If you try to sell them some junk you are trying to get rid of, somebody else is going to take that business away from you.

If the department store can tell you what the women want and you can make it, we will both make more money, won't we?

Now, will you ask me some questions?

Discussion of Silk Dyeing from the Consumer's Standpoint

Mr. Seiter—I would like to ask you a question. You specified tin weighted silks as not being washable.

Mr. Bouterse—I don't know about that. I asked that question.

Mr. Seiter—You said that as a buyer you have a great deal of trouble selling washable silks, that you get a lot of claims on them.

Mr. Bouterse—I beg your pardon. That is the only stuff we don't have trouble with. The stuff we have trouble with is the stuff that is not guaranteed by the manufacturers to be washable.

Mr. Seiter—You said that your wife bought a dress that was weighted, did you not?

Mr. Bouterse—I did not say it was weighted. The Lord only knows what it was. (Laughter.) She bought a dress and got a "gooey" spot on it in some way, and I spent five dollars to have it ruined some more. They couldn't even dry clean it.

Mr. Seiter—You don't know whether it was weighted?

Mr. Bouterse—Imagine a buyer saying he knows anything! (Laughter.) My merchandise man should hear me. I think it was weighted.

Mr. Seiter—That is different. If you think it was weighted why do you, as a buyer for L. Bamberger & Co., buy weighted goods?

Mr. Bouterse—Because that is about the only thing you can buy in a ready-to-wear department to-day.

Mr. Seiter—Why can't you buy pure dye fast color silks?

Mr. Bouterse—They should have more and more of them.

Mr. Seiter—Why don't you, as a buyer, insist on them? (Applause.)

Mr. Bouterse—I do. I want to make that point very clear. I think I tried to. We are selling more and more of the washable silks. Every month the business on washable silks is increasing.

Mr. Knowland—What do you consider a washable silk?

Mr. Bouterse—A fabric that will wash under ordinary conditions with a mild washing compound such as FAB, in tepid water.

Mr. Knowland—What is tepid water?

Mr. Bouterse—Just off of cold, neither hot nor cold. (Laughter.)

Mr. Knowland—We, as an organization, have a committee who have as their duty to investigate the properties of the fastness of dyestuffs to washing, light, and so forth. That committee lays down hard and fast rules which this organization follows, in order to designate what should constitute a fast color. For instance, we have Test S1, which says that a certain color is fast to such-and-such conditions. S1 consists of treating the color with so much soap and so much soda—

Mr. Bouterse—Yes, three minutes in and three minutes out.

Mr. Knowland—Do you follow that same classification?

Mr. Bouterse—Just try and get a woman to do that!

Mr. Knowland—I am not trying to get a woman to do that. I am trying to find out whether we, as chemists, shall live up to those conditions and whether you will accept those conditions and if you accept them whether they are passable.

Mr. Bouterse—Yes, it is the same old story as Holeproof Hosiery. If you have to get two or three per cent more for your silk to cover your insurance, go ahead, we will pay for it.

Mr. Knowland—We have got to.

Mr. Bouterse—Our concern used 6,664 sixty-yard pieces of one number of flat crepe de Chine from one concern last year, for which we paid one dollar and fifty cents per yard. That cloth was sold as a washable flat crepe by some of the stores in all but the very dark shades. We used it as a sale item throughout the holidays. A store in Pittsburgh sold about thirty-five or forty thousand dollars' worth of this one number in five weeks just before Christmas, and sold it as a washable flat crepe. I have a letter on my desk, to be answered to-morrow morning, in which Mr. Horning tells me that he had absolutely no trouble with it as far as the fastness of color was concerned. But they used ordinary precautions; they educated the sales person to the best of their ability and told the woman to wash it very carefully. As I say, they have had no trouble with it.

The man who sold us this merchandise wanted 12 cents a yard extra to put on the selvage "Guaranteed Washable." We said, "We will buy our own insurance," and it has been a very good buy; we bought our own insurance.

I have made propositions to several manufacturers along those lines, and I am sure other buyers are doing the same thing. We put one proposition up to a fellow; we got a cloth that we paid $1.85 for, made in this town, and he has it marked on the edge, "Washable Flat Crepe." Well, now, it really washes. I sent a piece to the U. S. Testing Company and you should see the beautiful piece of white I got back! (Laughter.)

We are praying like the dickens that the woman is not going to do that, and very few of them do; they give it ordinary care. However, if we get some roughneck who goes out and tries to wash it with Lenox soap in a washing machine, we are going to have to make an adjustment and we are going to do that with pleasure. Sir Walter Raleigh had nothing on the average department store man. All he did was lay his coat in the mud and ask the Queen to step on it. We lay ourselves in the mud. (Laughter.) You fellows get ——— from us, but we are so used to getting it that we can pass it along and never run out of it. We always have plenty of it in stock.

I have among my notes this one: Talk about adjustments. This is a very good one: A woman came into our store along in September some time. She was eating a salad of some sort in the Ivy Tea Room (some more advertising) and she broke a tooth. She said there was a piece of oyster shell or shrimp shell in the salad. She went to her dentist and had him fix up her whole mouth, repaint the whole thing, put in new fenders and everything. (Laughter.) She came back with a bill for $86 plus her lunch that day, plus six carfares, and there was another nickel or dime in there for something or other, I forget what; I think for smelling-salts, because of the shock she had when she broke her tooth. And we paid it. Can you imagine it? We paid it. I think our company wanted it to frame, but they paid it anyway.

That is the sort of thing that the department store is being subjected to every day in the week, so a few

more claims about the washability of silk mean nothing in our young lives.

I was going to tell you how many adjustments we had in the month of December. It might interest you to know that we had twenty clerks for one week after Christmas exchanging Christmas presents for people, crediting one thing to one person's account and returning something else that somebody gave them that they had shipped them the Christmas before. (Laughter.)

This is a good one, too: A great big cut glass had been broken, a glass shelf had slipped and it fell just flat, so that it broke and stayed right in perfect condition, although it was just ready to fall to pieces. It had cracked into about ten or twelve parts, almost like a pie. A woman came along the day before Christmas and bought it for 50 cents, and she paid the girl in the stockroom an extra 50 cents to be sure and get every little fragment that went with it. She had it tied up very carefully and sent it to some poor sucker out in Iowa for a Christmas present. (Laughter.) Naturally, the woman wrote her and told her how heartbroken she was about this beautiful bowl that had been broken in transit. (Laughter.)

To get back to the silk business, the guarantee that any manufacturer puts on a piece of merchandise is looked at very carefully by the average retailer.

For intsance, we have a cloth made by no less a house than H. R. Mallison & Co. You know, it is hard to convince a man that has made a million dollars that he is crazy. I have tried it. The name of this cloth is "Indestructible Voile" (what an awful lie to start with!), and on the border of the material are these words: "Looks Like Cobweb and Wears Like Broadcloth."

Think of the terrible psychology of the thing, and it has been a howling success! In the first place, when a woman hears the word "voile" she thinks of cotton, and cobweb is certainly anything but a sturdy article. Then, broadcloth to the minds of most women means wool or cotton. There isn't anything here that leads a woman to believe it is all silk and that it is really a wonderful piece of merchandise that will actually wash in a great many of the colors—and it is one of the most durable sheer silks in the country; outside of some triple voiles that are made in France, it is one of the most durable things we sell. And they have built up a tremendous business on it, without telling the customer that it is pure silk or that it is anything except a lot of names that have no connection with the silk business.

Then some other fellow came along with an article like it. Albert Godde Bedin makes it. It is called "Primrose Triple Voile," and this fellow's cloth has Mallinson's cloth beat forty ways, but you can't give it away. And he says it is pure silk, and everything else. It really is beautiful, but he can't sell the stuff.

There is a psychological problem (it has nothing to do with the dye business or the silk business or the department store business at all), simply because they haven't advertised it.

I will get into advertising right away, and that won't do at all.

What I meant to say when I started to talk about these two sheer silks is this: that an article of that sort is so fragile and delicate that the woman does not expect so much from it. Therefore we have less trouble with a cloth of that character than we do with a piece of crepe de Chine or flat crepe or satin crepe or Canton crepe. When a woman buys one of those cloths she expects it to give her hard service, and that is the place where so many of the dyers and manufacturers use such rotten judgment. They will go ahead and weight up to about 60 per cent a piece of merchandise that some working girl has to put on and wear and wear every day, and, naturally, she is heartbroken when the thing goes to pieces.

I want to close with one or two suggestions, as a retailer.

Gentlemen, if you are going to put your creative imagination to work for the women, for the retail trade, whether it is in the made-up garment or by the yard, for the love of Mike try to perfect a dye that can be put into a piece of silk, weighted or unweighted (I don't care which) that will wash. I want to repeat that; I can't emphasize it too strongly. Only a rich woman can afford to wear cotton underwear to-day. Did you know that?

There is one more thing. If you dyers and chemists in your research work allow the buyer (and I plead guilty to this) to dictate policies that are suicidal and destructive to the best interests of your business, you are crazy. I want to repeat that: If you allow us to dicate policies, policies that are destructive to your business; if you haven't got character enough and confidence enough in your own judgment to look a buyer in the eye and tell him, "All right, if that is the sort of junk you want, I am very sorry, you won't find it here"; if you are constantly going to make us believe that we are right, naturally we are going to keep pounding you over the head as long as we get what we apparently think are results from those methods. Am I right? (Applause.)

Mr. Knowland—The dyer is told to live up to certain specifications. In the first place, the mill lays down the price of a piece of cloth, in accordance with the price which the mill can get for that cloth. It is the dyer's job to dye that piece of cloth in accordance

with the price which the mill sells it for. Therefore, don't blame the dyer for it. If the dyer can get the price for it he is perfectly able to put on a dyestuff that will answer all the requirements that you may need. So don't blame the dyer.

Mr. Bouterse—I wish to correct that impression, if that is the impression I have left with you. You are absolutely right in what you say. The dyer, after all, is working on contract. You are executing orders that you receive from someone else. You are not in touch with the consumer, like the converter; but it is the finished product that is shown to me, and this is the thing I am talking about. A man shows me a piece of goods at one dollar and ninety-seven and a half cents and I kick him in the face. I come in with a blackjack in one hand and an order book in the other, and I try to use them both on this fellow. He finally takes five or six or seven cents a yard off, and then he changes the specification and takes it out of the goods.

We get what we pay for. I understand that. There is no such thing as receiving something for nothing; and it is cases like that, gentlemen, that are killing the business.

Are there any more questions?

Charles Lotte—Isn't it true that the cutting-up trade has played a great part in cheapening silks?

Mr. Bouterse—The cutting-up trade in the past few years have been the worst offenders in the direction of illegitimate and unethical practices. There is no doubt about that. The reason for that is that in a store like Bamberger's, where we do about $15,000,000 worth of business in women's ready-to-wear garments and only about $3,000,000 in fabrics by the yard (and that gives us a ratio of about five or six to one in the number of yards of goods that the cutter uses as compared with the over-the-counter trade), the cutter-up is the big user and naturally he is the fellow who dictates the policies.

But there is a growing tendency on the part of the American woman to be individual. She hates to meet eighteen or nineteen women on the same street with the same dress that she has on. The yard goods business over the counter has been coming up very rapidly just because of the thing you talk about. In fact, the cutter-up is beginning to suffer. The over-the-counter customers are increasing constantly. The American woman is getting sick and tired of seeing her beautiful dress copied by some sweatshop works for about a third of what she paid for it, so she is beginning to go out and look around in the department stores, in the specialty shops and in the silk shops for something individual and different, and she wants real merchandise; she wants to pay a real price if she can get quality.

Are there any more questions?

Mr. Clorenbach—You put the question and the problem up to the dyer and the silk manufacturer. I should say that the problem of helping things along for securing faster dyes is up to you rather than us; because, after all is said and done, you do the buying. If you insist on fast dyes only you will get them, because the dyers in Paterson have been making colors that are fast to washing for quite some years. If you don't specify that you want fast dyes they will give you anything at all; but if you specify fast dyes, that will help the situation along a good deal more than if you leave the problem with the dyers. If you will insist on fast dyes, even if your customer is not disposed to give them to you, that will in itself kill the fugitive dye business.

Mr. Bouterse—I wish that were true.

Mr. Clorenbach—It certainly is.

Mr. Bouterse—My experience has proven that it is not. I worked for six months with one house and did everything but withdraw my business from them before they finally brought out the sort of cloths I wanted that were washable. They cried and said, "Well, listen; you are the only fellow in the market who wants it." I am not the only fellow in the market who wants it!

Mr. Clorenbach—In that particular case your customer simply wanted to sell the silk he had, and he was humbugging you out of the thing you wanted.

Mr. Bouterse—Of course, he wanted me to take what he had.

Mr. Clorenbach—If you insist on getting what you want you can get it. It is up to you. You can also help the dyers in Paterson along by doing that. And as far as price is concerned, for dyeing, they need some help.

I will tell you how you can help: If you insist upon getting fast dyes, and your customer (the fellow from whom you buy the silk) insists in turn upon getting fast dyes from the dyehouse, the dyehouses in turn have a right to ask for a better price; and if they get it they can make fast dyes. There is no question about it. They can make any shade you want.

Mr. Bouterse—I believe, gentlemen, that your organization could do a real bit of missionary work by going on record in the press and in your trade journals on this proposition of fast dyes, and simply pointing out to the buyer and the consuming public the small difference in actual cost between making a fast dye and a fugitive dye. What is the difference in cost?

Mr. Knowland—Nothing at all. Let us not consider the cost. The cost of production doesn't enter into it at

all until after the product is produced. If you want a fast dye, tell us exactly what you want and we will consider the cost afterwards.

What is a fast color? That is what we want to know.

Mr. Bouterse—I assure you that I speak as a non-technical man on this subject.

Mr. Knowland—What temperature water should be used to wash them in?

Mr. Bouterse—The customer doesn't give a hoop about the technicalities. She wants to know if she can take the goods home and if it gets soiled, rinse it out in Lux, press it out and have a dress that will look presentable the next day.

That is your problem, gentlemen, as chemists.

Mr. Knowland—There is no reason in the world why you can't get fast colors. If you fellows want fast colors, I say it is up to you to tell us how fast, what temperature of water they are going to be washed in, how much soap is going to be used, and if you are going to use any alkali, say so. Lay down the hard facts about those things, and we will try to produce fast dyes to meet those requirements. We can do it now on everything except reds On reds we are stumped. And you have to pay for it.

Mr. Bouterse—I am very glad to hear that, because the manufacturer of silk tries to make the buyer believe that it is a very, very difficult task. You know, he looks very wise and you would think he had all the cares of the world on his shoulders.

Mr. Knowland—What colors are you stuck on? That is, what colors do you have trouble with, that don't wash?

Mr. Bouterse—Most all the pastel shades, outside of pink and maize, the deeper shades in greens or reds; some of the tans are pretty good. As you know, gentlemen, green is becoming an increasing factor in the color card for the next few months.

A group of us are sailing on the Aquitania on Saturday. We are to have a silk meeting in Lyons on March 1, and we are going to do some very intensive work along the line of fast color silks in France. As a group, we are vitally interested in the possibility and the probability of working very much closer to the raw material than we ever have before. In fact, we invite propositions from organizations to handle our problems as a group of stores, and if it is as simple as you people say it is (and I assure you that in the spare time I have had outside of the department store, I have been unable to gather any information as to why it should cost so much to have fast color silks; I seem unable to get anything except wise looks from these manufacturers)—

Mr. Knowland—It is not simple. I didn't say it was simple.

Mr. Bouterse—I should have used the word "costly."

Mr. Hopkins—To get away from this question of temperature, and alkali and soap, why can't you people specify vat colors and be done with it? Then you can put it in boiling soap.

Mr. Bouterse—According to the limited amount of information I have acquired as a buyer, the words "vat colors" are not a guaranty. Am I right?

Mr. Hopkins—They are better than anything else you will ever get.

Mr. Bouterse—Why should I say "vat color" when I mean fast color?

Mr. Hopkins—They are synonymous.

Mr. Bouterse—According to the information I have been able to collect, they are not synonymous. Are there some technicians who can back me up? Are the two synonymous?

Mr. Bouterse—According to the information I have been able to collect, they are not synonymous. Are there some technicians who can back me up? Are the two synonymous?

. . . Crys of "Yes" and "No" from various parts of the audience. The meeting seemed about equally divided on this question. . . .

Mr. Bouterse—We have here a house divided against itself, which cannot stand. We will have to take a vote on this thing yet. (Laughter.)

Mr. Clorenbach—Since it is necessary to have dresses look nice, they are finished for the purpose of draping well. If you wash your goods at a normal temperature, something like 110 or 120, that is warm enough to take out any spots that may be in the material and to clean the goods. If you go much higher than that, you will not only take out some of the color but you will take out the finish.

Mr. Bouterse—I think I am safe in going on record as a silk man to the effect that no silk buyer would expect a cloth to hold its color in more than 110 degrees.

Mr. Clorenbach—There are materials being dyed in Paterson to-day that will stand 140 deg. Fahr., with a one per cent soap solution. There are any number of them.

Mr. Bouterse—How many fabrics are there in this market being dyed now that will stand 120 deg. Fahr.?

Mr. Jacoby—There isn't a modern dye house in Paterson that can't supply you with what you want if you will demand it.

Member—It does cost more.

Mr. Bouterse—How much more?

Member—Between four and five cents a yard.

Mr. Bouterse—As I have said several times this evening, all we want is a cloth that a woman can take into the bathroom, wash out in a little Lux, rinse out and press with an ordinary warm iron.

Mr. Jacoby—There isn't a good modern dyer in Paterson that can't give it to you.

Mr. Bouterse—That point being settled, and the merchandise being available, the question still remains unanswered as to how much extra it will cost.

Member—Anywhere from four to five cents a yard more.

Mr. Puller—And more.

Mr. Bouterse—How much more? One man says four to five cents more. How much am I bid over here? (Laughter.)

Mr. Hopkins—I will give you the figures if somebody will transfer them into terms of yardage.

E. F. L. Lotte—I want to ask you a question. Isn't that demand just coming in now? That is, isn't it a fact that people are becoming educated to it, and isn't it also a fact that you retailers and some others have educated the women as to how to wash goods? As a matter of fact, dyers did not want to give any guaranty on their products because the women didn't know how to wash the goods properly. In the first place, they didn't use the proper amount of soap. They used too much heat. In the next place, they didn't use enough water and allowed the goods to soil more than they should be before they did wash them.

Take, as an example, the underwear manufacturers; they are using material to-day which washes. So are the silk hosiery manufacturers. But the women have been educated to the fact that they must wash their silk hosiery every day, and the same way with underwear and all those things.

If we had attempted to educate them to that five years ago, we would have lost our shirts because we would have been ahead of time.

Mr. Bouterse—You are absolutely right.

Mr. Lotte—It is only as you demand it and as the trade demands it that it is our duty to give it. As has been said, if you will give the dyer the specifications, you will get what you want. We attempted to give this kind of a product to the trade five years ago, or eight years ago, and they absolutely refused to pay for it.

Mr. Bouterse—You are absolutely right, except on one point: It was not our educational work that brought about these things; we were forced to give it to the customer.

Mr. Lotte—But you had people to each the women how to wash and iron these materials, this hosiery and underwear. All those things have been a help. Now, I believe that the dyers, retailers and all the rest will come together and get to the point where they will be able to give the public something in the way of fast colors. But a few years ago, when we tried it, the public was not ready for it and the styles didn't demand it.

As you said early in your talk, the American woman to-day is probably living more like the Englishwoman than ever before in our history. Five years ago, the woman bought a dress, and she didn't wash it. Taffetas didn't require washing.

So that I think we are coming to the point where the trade will demand it, and then we will give it. Of course, there are some things that the buyer must understand: for instance, that there are certain shades that are quite fancy that don't wash, and each time he says to the dyer, "Make them a little brighter," he forces the dyer to put something in there that is not fast.

You can get reasonably fast colors providing you take the colors of the dyestuffs that are available to make them fast. In doing that you will have to sacrifice style to some extent and take the fabrics that they can use and the dyestuffs that stand the demands to-day. When you ask the dyer to give you something that he hasn't got and you force him down and say to him, "I must have something to produce thus-and-so," you are just sacrificing fastness for brightness, or something like that. You must take the colors that he can give you, that will stand the demands that you make.

I feel that we can get together on this and that you will get what you want and we won't be humbugging the public and telling them, "We can give you this bright shade which is absolutely fast," when we know we can't do any such thing; instead, we will give them one that is just a trifle duller but that will meet all the requirements and go through. (Applause.)

Mr. Bouterse—I agree with that. Maybe that is why the Cheney organization is trying to popularize these mezzo-tones.

Mr. Lotte—That may be possible.

There is another point I would like to make with reference to vats. Vats are not practical for pure silks that wash at 120 deg. In the first place, you can't dye piece dye silks and have them even in color, and the shades are limited in vats. We all appreciate that. They are not practical, and are not what you need. They are, however, good for some purposes, as has been proven in the last year by research; but they are not synonymous with fast colors. Neither are Indanthrenes, because in some of the light shades they are not fast. Another thing: they will bleed. So, as I say, they are not synonymous with fast colors.

There is another question that I had in mind. You spoke about judging whether goods were weighted or unweighted by the fact that they stain. Weighted goods will resist street dirt and so on better than unweighted goods. The fact that a piece of goods will take stain doesn't mean that it is weighted or unweighted, because unweighted silk is more absorbent; and, as far as staining is concerned, I think you will find that the unweighted goods will stain quicker and absorb anything that is dropped on it quicker than weighted goods.

Mr. Bouterse—I understand that. My comment was

not that it stained because it was weighted. I made the statement that the silk stained and would not even dry clean. That was my accusation.

Mr. Lotte—That is something that should be worked out because I question whether that was due to the fact that it was weighted. It may have been due to the dry cleaning, or it may have been the fiber, because there are some fibers that are more absorbent than others, and I should think it would have been easier to clean if it had been weighted.

Mr. Bouterse—Does this organization have a committee that works in conjunction with the National Dry Cleaners and Dyers?

Mr. Knowland—It does not.

Mr. Bouterse—They are quite ignorant about some types of merchandise.

Mr. Knowland—May I interrupt you? That is a very good argument that you bring forward there. This organization does not admit dry cleaners, and it should.

Mr. Bouterse—They come in contact with the everyday life of the woman who wears the silk very much more than you fellows do. They don't even know there is such an organization as this in existence.

Chairman Grandage—May I interrupt just a minute? Dr. Scott, of Cheney Brothers, who I believe is Chairman of the Fastness Committee on Silks, is with us. Dr. Scott, would you mind saying just a word or two which might guide Mr. Bouterse and perhaps some of our members?

Dr. Walter M. Scott—All that the Committee on Fastness to Washing of this Association has tried to do is to bring out the point that has been raised here several times, as to what is fast material; that is, what are the requirements for fastness to washing.

We have endeavored to formulate tests, standard tests, which will denote various degrees of fastness to washing, because in anything that you ever come across you will find that fastness is only relative. As has been brought out, even the vat colors which are supposed to be synonymous with fastness, under certain conditions are not fast; they will not stand everything. So that "fastness toward washing" is only a relative term.

As far as we have gone, we have endeavored to formulate certain tests of varying degrees of severity to which we can subject our goods and determine their relative fastness toward washing. I might say we already have such tests which are fairly simple and easy to work, but now the question is just the point which you brought up, as to which one of those tests will meet the requirements of the housewife or of the woman who is going to use the goods. In an endeavor to correlate those tests with practical usage, we are now arranging through Mr. Appel of the Bureau of Standards to send out samples of material which have been dyed to stand each one of our tests from the very lowest up to the highest degree of fastness; we are going to send those out to every laboratory that we can think of that has to do with that particular thing, for instance, the laboratory of the Good Housekeeping Magazine, which is in touch with the readers of that magazine, and laboratories of large department stores, such as Marshall Field's, possibly, or Filene's.

We are also trying to get in touch with the soap manufacturers, who have done a lot of good work (for instance, Procter & Gamble, Swift & Co., and the larger soap manufacturers), and to submit to them, also to the National Laundryowners' Association, samples of these fabrics which will stand the varying degrees of test according to our laboratory test, and see which one will meet the general requirements in the trade, because that is the only way in which we can come together.

A manufacturer can't duplicate in his laboratory the actual conditions a housewife works under, because he doesn't know just what they are, but he can, in the first place, try to educate the housewife. That has been done pretty well by the soap manufacturers and others. Then he can correlate his own laboratory tests with what he learns about the requirements in the trade, and that is where we are at the present time.

That is about all I can say on the subject. Admittedly, we haven't solved it entirely but we think that we have taken a first step by trying to get some common language that we can talk, other than this simple term "fastness" which nobody can interpret. (Applause.)

Mr. Bouterse—Station WOR now signing off. (Laughter and applause.)

Chairman Grandage—We are indebted to Mr. Bouterse for this most able talk he has given us from the consumer's standpoint.

Before it is too late, I want to say on behalf of the New York Section that we are mighty glad to welcome a lot of men here to-night who are not members of our Association.

. . . Announcement was made about meetings of New York Section and requirements for membership. . . .

Chairman Grandage—Are there any other matters that any of the members wish to bring before the meeting before we adjourn? If not, I will ask for a rising vote of thanks to our three speakers of the evening.

Mr. Ecker—I so move.

. . . The motion for a rising vote of thanks to the speakers of the evening was unanimously carried. . . (Applause.)

. . . The meeting adjourned at 10.45 P. M. . . .

THIRTY-FIFTH COUNCIL MEETING

The thirty-fifth Council meeting of the American Association of Textile Chemists and Colorists was held December 4, 1925, at the Engineers' Club, Boston, Mass.

The following members were in attendance: L. A. Olney, William D. Livermore, W. C. Durfee, E. H. Killheffer, W. M. Scott, William H. Cady, W. S. Williams, J. F. Bannan, William R. Moorhouse, R. F. Culver and W. E. Hadley.

The following applicants were elected to membership:

Active Members

Dabbs, John L., Southern manager, E. I. du Pont de Nemours & Co.; Box 1251, Charlotte, N. C.

Denis, Armand Georges, chemical engineer, Slater Mills; Webster, Mass.

Furman, Albert, foreman dyer, Boyd & Co., Inc., Bronx, N. Y.; 1026 Trinity Avenue, Bronx, N. Y.

Grimshaw, Albert H., associate professor, North Carolina State College Textile School, charge of dyeing and finishing department, Raleigh, N. C.; 16 Enterprise Street, West Raleigh, N. C.

Hood, George C., dyer, Merrimack Manufacturing Company, Lowell, Mass.; 11 Shattuck Street, Nashua, N. H.

McKee, John L., salesman and demonstrator, John Campbell & Co., Charlotte, N. C.; 136 West End, Chester, S. C.

McNab, J. H., dyestuff salesman, Nyanza Color & Chemical Company, Knoxville, Tenn.; 911 North Sixth Avenue, Knoxville, Tenn.

Millen, John M., mercerizer foreman, National Yarn & Processing Company, Chattanooga, Tenn.; 305 High Street.

Murphy, William T., overseer of dyeing, Pacific Mills, Lawrence, Mass.; 50 High Street, Methuen, Mass.

Ordway, Charles B., textile dyer and chemist, Spalding Knitting Mills, Griffin, Ga.; Spalding Knitting Mills, Griffin, Ga.

Phetteplace, B. S., general manager, Southern Franklin Process Company, Greenville, S. C.; 200 East Prentiss Avenue.

Shendel, Jr., John N., dyer, S. Roseman & Co., Philadelphia, Pa.; 3065 Richmond Street, Philadelphia, Pa.

Van Mater, H. L., chemist, American Dyewood Company, New York, N. Y.; 216 South Third Avenue, Highland Park.

Vellner, Stephen, chemist, demonstrator and salesman, Eugene Vellner; 4721 D Street, Philadelphia, Pa.

Junior Members

Fidelglotz, Louis L., chemist in charge application laboratory laboratory, John Campbell & Co., New York, N. Y.; 213 Hancock Street, Brooklyn, N. Y.

Glidden, Harlan E., student, Philadelphia Textile School, Philadelphia, Pa.; Swathmore, Pa.

Graves, A. N., textile chemist and colorist, Franklin Process Company; Providence, R. I.

Stringfellow, William A., textile chemist, National Aniline & Chemical Company, Philadelphia, Pa.; 6016 North Twentieth Street.

Two members were transferred from the list of junior to that of active members: Albro N. Dana and Alden D. Nute.

A corporate member was received into membership: Heberlein & Co., A. G., Wattwil, Switzerland.

Heberlein & Co., A. G., are cotton finishers, dyers, bleachers and printers. F. August Schroeder, 200 Fifth Avenue, New York, N. Y., will act as their representative in the affairs of the Association.

Some time ago a prize was offered for the best paper appearing in the Proceedings, and the following committee was appointed to report regarding this matter: William H. Cady, E. H. Killheffer, William R. Moorhouse, P. J. Wood and W. S. Williams.

A. R. Thompson, representing the Local Section in the South, extended an earnest invitation to the Council that the next Annual Meeting (1926) be held in the South. A letter was also received from the New York Local Section extending an invitation to have the next Annual Meeting held in New York City. After considerable discussion the Council voted to accept the invitation of the Southern Section.

W. E. Hadley, *Secretary.*

THIRTY-FIRST RESEARCH COMMITTEE MEETING

The thirty-first Research Committee meeting of the American Association of Textile Chemists and Colorists was held at the Engineers' Club, Boston, Mass., on December 4, 1925.

The following members were in attendance: L. A. Olney, William D. Livermore, W. C. Durfee, E. H. Killheffer, W. M. Scott, William H. Cady, W. S. Williams, J. F. Bannan, William R. Moorhouse, R. F. Culver, R. E. Rose, H. Christison, William D. Appel, P. J. Wood, W. J. Murray, H. W. Leitch and W. E. Hadley.

Mr. Appel is about ready to distribute dyed samples to different laboratories and individuals for testing purposes, in order to obtain information as to the results when working with the fastness tests which the Research Committee have devised.

It was suggested that someone might be engaged to do some of the research work which the committee has in mind, having such work under the direction of Mr. Appel during the coming summer. The sum of $600 was voted for this work.

W. E. Hadley, *Secretary.*

THIRTY-SIXTH COUNCIL MEETING

The thirty-sixth Council meeting of the American Association of Textile Chemists and Colorists was held on Friday afternoon, January 29, 1926, at the Engineers' Club, Boston, Mass.

The following members were in attendance: L. A. Olney, W. D. Livermore, W. C. Durfee, G. A. Moran, W. M. Scott, J. F. Bannan and W. E. Hadley.

Letters of regret at not being able to attend were received from P. J. Wood, W. R. Moorhouse, Edw. F. L. Lotte and Leonard S. Little.

The following applicants were admitted to membership:

Active Members

Anderson, Arthur J., demonstrating salesman, National Aniline & Chemical Company, New York, N. Y.; 39 Sparkhill Avenue, Albany, N. Y.

Caffrey, Raymond D., dyer, Pacific Mills, Lawrence, Mass.; Dartmouth Court Apartment, Methuen, Mass.

Doubman, John M., chemist and dyer, J. B. Stetson Company; 228 East Johnson Street, Germantown, Philadelphia, Pa.

Goodwin, Arthur, bleacher and mercerizer, Slatersville Finishing Company; P. O. Box 148, Slatersville, R. I.

Grinnell, K. M., dyer, Fall River Bleachery; 1188 New Boston Road, Fall River, Mass.

Gutman, Samuel, general manager, Lobsitz Mills Company, Nutley, N. J.

Jackson, Lloyd, research chemist, Mellon Institute, Pittsburgh, Pa.

Knoll, George L., colorist, J. H. & C. K. Eagle; Hotel Graemar, Shamokin, Pa.

Lovit, Isaac, chemist, American Printing Company, 159 Jencks Street, Fall River, Mass.

Maupai, Eugene L., president F. P. Maupai Dyeing Company, Inc., 620 Thirteenth Street, West New York, N. J.

Macdonald, Hector G., chemist, Franklin Process Company, Providence, R. I.; 149 Massachusetts Avenue, Providence, R. I.

McDowell, J. C., superintendent, Ware Shoals Bleachery, Box 54, Ware Shoals, S. C.

McRae, Cameron M., Southern representative, Arabol Manufacturing Company, P. O. Box 223, Concord, N. H.

Rawcliffe, Arthur, dyer, S. Slater & Sons, Inc., 8 Stoughton Avenue, Webster, Mass.

Scott, Harold Martin, technical chemist, Robert Clay, Ltd., Cheadle, Cheshire, England.

Searle, David H., dyestuff salesman, Grasselli Dyestuff Corporation, 8 Delawanda Drive, Worcester, Mass.

Smith, Harold D. W., chemist and textile engineer, Wellington, Sers & Co., 66 Worth Street, New York, N. Y.

Talbot, Joseph L., cotton dyer, Pacific Mills Print Works, Lawrence, Mass.; 8 Fulton Street, Methuen, Mass.

Van Tromp, Govier G., research chemist, A. E. Staley Manufacturing Company, Decatur, Ill.

Waldron, Harry E., dyer, Thermo Mills, Inc., Box 151, West Sand Lake, N. Y.

Walsh, J. William, dyer, Textile Silk Dye Works, Philadelphia, Pa.; 253 Roberts Avenue, Glenside, Pa.

Junior Members

Barnhardt, William H., salesman in training, E. I. du Pont de Nemours & Co., Deepwater Point, N. J.; 18 Sack Avenue, Penns Grove, N. J.

Borden, Jefferson, 4th, student, Bradford Durfee Textile School, 291 Cherry Street, Fall River, Mass.

Brehm, Richard H., 2nd, student, Philadelphia Textile School, 2100 West Venango Street, Philadelphia, Pa.

Dole, Robert H., dyer, Dodge Davis Manufacturing Company, Bristol, N. H.

Flood, Thomas H., student, Lowell Textile School, 49 Madison Street, Lowell, Mass.

Gutekunst, William R., student, Philadelphia Textile School, 1435 North Fifth Street, Philadelphia, Pa.

Keebler, Walter Fred, student, New Bedford Textile School, 742 Second Avenue, W., Owen Sound, Ont., Canada.

Killheffer, John V., student, Lowell Textile School, 14 Mount Washington Street, Lowell, Mass.

Sayers, William J., chemist, Apponaug Company, Box 334, Apponaug, R. I.

The following Junior Members were transferred to Active Membership: Allison R. Fletcher, Carl E. Hartwig, Heyward F. Lawton and Clarence L. Nutting.

Rohm & Haas Company, South Bristol, Pa., chemical manufacturers, were added to the list of Corporate Members.

A committee consisting of W. D. Livermore, J. F. Bannan, W. H. Whitehill, H. Christison and G. A. Moran was appointed to consider the advisability of revising that section of the constitution which refers to the method of nominating officers and report back to the Council.

W. E. HADLEY, *Secretary.*

THIRTY-SECOND RESEARCH COMMITTEE MEETING

The thirty-second meeting of the Research Committee of the American Association of Textile Chemists and

Colorists was held on Friday afternoon, January 29, 1926, at the Engineers' Club, Boston, Mass.

The following members were present: L. A. Olney, W. D. Livermore, W. C. Durfee, G. A. Moran, W. M. Scott, J. F. Bannan, H. W. Leitch, R. W. Hook, W. H. Cady and W. E. Hadley.

The Committee on Light Fastness, William H. Cady, Chairman, reported progress.

A letter from W. D. Appel, Bureau of Standards, stated that arrangements are being made for carrying on further light tests during the coming summer. He further stated that samples of dyed material were being forwarded to various technical laboratories and organizations that maintain textile laboratories, in order that the tentative fastness methods prepared by the Association may be given a thorough trial, with the object of ascertaining their adaptability under varying conditions, and under the direction of different workers.

Professor Olney, who is acting as the Association representative in the meetings held by the Converters' Association, gave an outline of the standards which they are attempting to formulate, although there was nothing definite to report in this matter at the present time.

G. A. Moran and W. M. Scott were asked to review the methods of fastness tests upon silk and upon cotton, and determine in what way these tests could be revised to cover artificial silk.

W. E. HADLEY, *Secretary.*

Applicants for Membership

Active Membership

Asbury, Jr., Frank L., superintendent, Hillside Cotton Mills, La Grange, Ga. Sponsors: L. L. Bamberger and P. A. Merriam.

Callahan, Cornelius A., assistant chemist, Pacific Mills, Lawrence, Mass. Sponsors: Geo. A. Moran and Wm. H. Cady.

Cassel, Norman S., chemical engineer, Procter & Gamble Company, Ivorydale, Ohio. Sponsors: H. Grandage and D. P. Knowland.

Clement, Jr., Earle A., superintendent, Globe Knitting Works, Grand Rapids, Mich. Sponsors: F. R. McGowan and Ed M. Schenke.

Ehrengart, Chas. D., demonstrator, Onyx Oil & Chemical Company, Jersey City, N. J. Sponsors: H. Grandage and D. P. Knowland.

Everett, Kenneth C., assistant textile chemist, Aspinook Company, Jewett City, Conn. Sponsors: K. B. Church and James Blair.

Gulick, C. P., treasurer and general sales manager, National Oil Products Company, Harrison, N. J. Sponsors: D. P. Knowland and H.Grandage.

Lange, Harry W., chief chemist, Oakes Manufacturing Company, Flushing, N. Y. Sponsors: H. J. Stulz and F. M. Bonnett.

Perry, Thos. C., superintendent, North Carolina Finishing Company, Salisbury, N. C. Sponsors: H. W. Ormand and A. R. Thompson, Jr.

Sandridge, J. D., demonstrator, Du Pont Company, Greensboro, N. C. Sponsors: Chas. Walker and Chas. H. Stone.

Scheuer, J. B., dyer and bleacher, Southern Bleachery, Greenville, S. C. Sponsors: C. H. Stone and B. S. Phetteplace.

Stephenson, Jr., R. J., superintendent, Southern Bleachery, Greenville, S. C. Sponsors: C. H. Stone and B. S. Phetteplace.

Junior Membership

Carmel, S. L., research chemist, textile division, H. Kohnstamm & Co., New York, N. Y. Sponsors: D. P. Knowland and A. Elssmann.

Hodges, George S., assistant superintendent, Perkins Hosiery Mills, Columbus, Ga. Sponsors: C. A. Jones and L. L. Bamberger.

Moreau, Antonio J., assistant dyer, Apponaug Finishing Company, Apponaug, R. I. Sponsors: H. N. F. Schaeffer and P. C. Putnam.

Rice, Frank C., colorist, Zinser & Co., Hastings-on-Hudson, N. Y. Sponsors: O. C. Bartenbach and F. X. Lehmann.

Rice, Frank, colorist, Zinsser & Co., Hastings-on-Hudson, N. Y. Sponsors: F. X. Lehman and O. C. Bartenbach.

ASSOCIATION BADGES

The lapel button badge illustrated herewith is worn by members of the American Association of Textile Chemists and Colorists.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

WALTER E. HADLEY,
5 Mountain Avenue,
Maplewood, N. J.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Directing Editor

CLAYTON HOAGLAND
Managing Editor

Published biweekly by
HOWES PUBLISHING CO., INC.
90 William Street, New York City

A. P. HOWES, *President* E. S. PREDMORE, *Secretary*

Subscription price $5.00 per year; Canadian $5.50; foreign $6.00

Vol. XV February 22, 1926 No. 3

STANDING GUARD OVER THE TARIFF LAW

TWO recent decisions handed down by the United States Customs Court of Appeals have materially strengthened the tariff protection of the American dye industry by their fair and accurate interpretation of the present tariff law.

Both cases involved the question of the competitiveness of an imported product. In one, the point chiefly contended was that although no actual sale had been made of the *domestic* product, in this case pyrazolon, it was strictly legal to class the imported product as competitive on the fact that the former had been freely offered for sale at a reasonable price in the domestic markets.

The importer in this instance had insisted that there was no evidence which showed that the American competitive product, a pyrazolon manufactured by the Pharma-Chemical Company, was ever freely offered to all purchasers in the principal markets of the United States. After hearing exhaustive testimony submitted by both sides it was concluded by the court that the domestic pyrazolon had been freely offered and advertised in the market, though none had been sold.

The importer, however, further claimed that the price of this product in the domestic market had been so high as to be prohibitive. The testimony submitted led the court to find that this contention had no basis in fact. It was explained during the proceedings that the pyrazolon under question constituted over three-fourths of the expense of producing the finished dyestuff, Fast Light Yellow, in which this intermediate entered. As the finished dye can be produced at from $2.77 to $3.32 a pound, in fact, was sold at a retail price of $3.25 in the domestic market, and as it would require four-fifths of a pound of pyrazolon, worth $2.50, in addition to other ingredients, to manufacture *one* pound of Fast Light Yellow, the court decided that the price of $4.00 per pound for the pyrazolone "does not seem to have been fanciful or unreasonable . . . but one very closely approximating its proportional part of the cost of the finished dye." In this connection the court observed:

> When it appears an arbitrary price has been set upon an American competitive product which is unreasonably high and having no just proportion to its cost of production, such a price will be subjected to close scrutiny by this court before being approved as the basis of an American selling price. But it should also be suggested, in this connection, that neither the law nor reason requires that the American producer shall fix such a selling price upon a coal tar intermediate produced by him that his competitors may buy it upon the market, use it in the manufacture of a completed dye, and profitably undersell the completed product of this American producer, on the open market. All the law requires, in our opinion, is that the price of the raw material or partly manufactured substance, produced by the American manufacturer, shall bear a fair and reasonable portion to the cost of the completed article to be made therefrom.

In the second case, which involved the classification as competitive of an imported Alizarine Blue Black B, the importer alleged that the domestic dyestuff of the same name could not be used to obtain substantially the same results as those obtained with the imported color.

The testimony submitted in this case, during the course of which several dye experts were called upon to testify, established, in the words of the decision:

> That the use of exactly the same proportion of the domestic and imported dyestuffs do not produce absolutely the same result; that to do so there must be a slight change in the formula. When changed they do produce substantially the same result. . . . It must be borne in mind that the domestic article is the basis of comparison and the color produced by the domestic formula is the criterion. The imported article will produce like results if the formula is slightly changed. This is entirely up to the dyer, and if with such slight change the results are the same, it is our judgment that each accomplishes the same result and is used in substantially the same manner.

Then, upon the importer's contention that under the tariff law imported and domestic dyes cannot be considered as competitive if, when used as *self colors*, they produce results that are commercially different, as in this case, the decision maintains:

> Of this it may be said that if Congress had so intended, it were easy to have declared that the

question of competition should be determined on that basis. Manifestly that was not the intent.

In this case it appears that both the imported and domestic dyes *may* be, and to some extent *are*, used as self colors, but a large, if not the chief use thereof, is in combination with other dyes. To give the paragraph the interpretation claimed by the importer would be to defeat rather than carry out the apparent Congressional intent.

This construction is of the utmost importance to the American dyestuff industry for the reason that fully 95 per cent of all dyestuffs used, it can be safely said, are used in combination with other dyestuffs.

For their impartial interpretation of the tariff law these two decisions will go on record as outstanding examples of the admirable type of justice that prevails in the highest customs tribunal. Notable in these cases, as well as in several that have been tried by this court in the past, is not only the fine, sterling spirit of absolute fairness in which such decisions are rendered; there is also clearly actuating the often-maligned "machinery of the law" a most commendable *insight*, shown distinctly in its consideration of the tariff act as an instrument designed in this case for the protection of the American dyestuff industry. Such insight is quick to discern any and all attempts to poke holes in the tariff law at places where such perforation would soon transform it into an utterly ineffective scrap of paper—something that would be a fitting monument indeed with which to commemorate our long struggle for independence and protection.

COAL TAR EXPORTS INCREASE

Exports of aniline oil and salts for December totaled 75,728 pounds, valued at $11,6111. Exports of other intermediates amounted to $169,836 pounds, valued at $31,940. Exports of coal-tar colors, dyes and stains for the month of December amounted to 3,004,553 pounds, valued at $680,689.

Figures which have been made public by the Department of Commerce show also that during December 6,006,330 pounds of benzol were exported, valued at $225,565, and 3,286 barrels of crude coal-tar, valued at $9,582. Coal-tar pitch exported in December totaled 633 barrels, valued at $3,370. Exports of other crude distillates for December amounted to 1,218,934 pounds, valued at $47,568.

The Franklin Process Company, Providence, R. I., has filed plans for improvements in its mill on Eddy Street, to include the installation of a mezzanine floor for increased working space.

The United States Finishing Company, Providence, R. I., is laying foundations for its new office building, estimated to cost $15,000.

INQUIRY DEPARTMENT

All classes of chemical work or advice relating to artificial colors, natural dyestuffs, dyewoods, raw materials, extracts, intermediates, crudes, or dyeing chemicals and accessories in general, will be carried out for readers and subscribers of the AMERICAN DYESTUFF REPORTER by this department.

Inquiries of a minor character will be answered on this page, while major matters involving personal investigation, analyses, perfected processes and working formulas, will, if desired, be treated confidentially through the mails. In answering inquiries which, by their nature, require reference to the products, processes or apparatus of some particular manufacturer we aim to be absolutely impartial. We refer the inquiries to specialists whom we believe to be best qualified to answer them intelligently, and must disclaim responsibility if their reports show unintentional bias. All questions, materials for analysis or letters leading to the opening of negotiations for special work will receive prompt attention if addressed to Inquiry Department, American Dyestuff Reporter, 90 William Street, New York City.

D. A. T. Co.—Question: We are in need of materials that are used in waterproofing and mildew-proofing cotton goods, such as 8-10 and 12-ounce gray duck. If you will be so kind as to furnish us with information of where to purchase such material, or a formula of such, it will be very much appreciated.

Answer: To the best of our knowledge and belief there is no mildew-proofing compound on the market. In fact, to render completed goods mildew-proof would be quite a difficult operation.

Mildew generally develops first in the size used on the materials. Therefore, to prevent its inception, the best plan is to incorporate some antiseptic with the size paste or liquid. We assume that you do not manufacture your own ducks. In this case, we suggest that you instruct the mill from whom you buy your ducks to incorporate in their size preparation salicylic acid, ½ to 1 ounce to the gallon. Carbolic acid or phenol could be equally well used, but would leave a noticeable odor.

There are several waterproofing compounds on the market. We are sending you the names and addresses of several manufacturers of such under separate cover.

It might be possible for you to waterproof the fabrics yourselves, although we are not quite sure as to the method. We believe, however, that if you were to wet out the goods thoroughly in a fairly strong soap solution and then run them through a bath containing a small percentage of alum you would accomplish the desired result. It might be worth while for you to experiment along these lines in your laboratory.

Harry A. Boardman, for many years superintendent of bleaching in the Manville Mills of the Manville-Jenckes Company, has resigned and been succeeded by Jesse Whitwoth, Lowell, Mass.

Acetate Silk—Its Dyes and Their Application

Part VII

SUPPLEMENTAL TO THE PRECEDING SERIES OF ARTICLES ON DYEING ACETATE SILK

Stripping the SRA Dyes—The Dispersal Patents—Dispersal Dyes on Other Fibers—The "Sulphato" Acid Dyes—Mordanting Acetate Silk—Direct Cotton Dyes on Acetate Silk

By CHAS. E. MULLIN, M. Sc., F. A. I. C.

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THE American Cellulose & Chemical Company state that many colors on Celanese may be stripped for redyeing according to Method No. 139 (below). Where this is not sufficient, the goods may be given a bleach as in Method No. 140. This usually gives a pale level yellow or white ground. After the stripping treatment the goods should be soaped in a bath containing 2 c.c. per liter of Turkey Red oil. The same stripping operations may be used on Celanese-cotton unions as on Celanese, but Method No. 140 should not be used on materials containing wool or silk, as these do not withstand the hypochlorite very well. In this case a peroxide or permanganate bleach, as mentioned in Part I of this series (page 765, AMERICAN DYESTUFF REPORTER, Nov. 16, 1925) may be used. In cases where the shade is just dyed slightly heavy, it may sometimes be stripped sufficiently by working the goods in a fresh bath prepared with soap and Turkey Red oil, or even a little soda ash, at 80 deg. Cent. (176 deg. Fahr.).

Method No. 139: *Stripping Celanese.*—Work the goods fo thirty to forty-five minutes at 75 deg. Cent. (167 deg. Fahr.) in a bath, each liter of which contains 2.5 grams of olive oil soap, 0.5 gram of caustic soda, 5 grams of sodium hydrosulphite and one cubic centimeter of ammonia. Rinse well.

Method No. 140: *Stripping Celanese.*—Work the goods for thirty minutes or longer in a 0.25 deg. Tw. sodium hypochlorite bath which is just acid with hydrochloric acid. Rinse well and give an antichlor treatment at 60 deg. Cent. (140 deg. Fahr.) with sodium bisulphite or thiosulphate, as in Method No. 13 (page 238, Dyeing Acetate Silk, Part II).

THE DISPERSAL PATENTS

The following patents are of interest in connection with the dispersal dyes. British Patent No. 230,116, September 3, 1923, to Scottish Dyes, E. G. Beckett and J. Thomas covers the production of a purple dye for acetate silk from phthalimidoanthraquinone, described in British Patent No. 214,765. The nitration of 1-phthalimidoanthraquinone at 15 to 20 deg. Cent. (57 to 66 deg. Fahr.) in concentrated sulphuric acid gives a dinitro derivative which is hydrolyzed by 85 per cent sulphuric acid at 85 deg. Cent. (185 deg. Fahr.) to a dinitro-1-aminoanthraquinone. This upon reduction with sodium sulphide in an aqueous sodium hydroxide solution at 80 deg. Cent. (176 deg. Fahr.) gives triaminoanthraquinone; bronze crystals which in aqueous suspension dye acetate silk deep purple shades. The triaminoanthraquinone may be benzoylated with benzoyl chloride in pyridine or nitrobenzene solution to give a reddish-purple crystalline product which dyes cotton bluish-red shades fast to washing, bleaching and light, from an alkaline hydrosulphite vat. Possibly the above patent may cover the Celatene Brilliant Violets B and and 2R.

British Patent No. 231,206, March 21 and September 14, 1923, to Scottish Dyes, E. G. Beckett, J. Thomas and J. Tonkin, states that acetate silk is dyed greenish-blue to deep blue shades by immersion in a hot aqueous suspension of hexa-aminodianthraquinonylthioether, or a dyestuff obtained by the nitration of 1, 5- or 1, 8-diphthalimidoanthraquinone (see British Patent No. 214,765) and subsequent hydrolysis of the product by means of an alkaline sulphide. For example, a blue dyestuff is obtained by nitrating 50 grams of 1, 5-diphthalimino anthraquinone dissolved in 500 grams of 97 per cent sulphuric acid for one hour at 30 deg. Cent. (87 deg. Fahr.) by the addition of 62 grams of 80 per cent nitric acid and 50 grams of 97 per cent sulphuric acid. The product is poured into 5 liters of water, filtered, the residue washed free from acid, heated for one hour at 80 deg. Cent. (176 deg. Fahr.) in 1,500 c.c. of water containing 227 grams of sodium sulphide crystals and 35 grams of caustic soda, the product hot filtered, and the dyestuff residue washed and dried. The resulting blue dye is slightly soluble in water and may correspond to Celatene Blue.

The British Patent No. 214,765, February 8, 1923, to H. A. E. Drescher, J. Thomas and Scottish Dyes, mentioned before, states that anthraquinoneimides of di-basic acids are obtained by heating a halogenanthraquinone with an imide of a di-basic acid in the presence of copper and an acid absorber, or with copper and a metal imide

salt. The imides yield aminoanthraquinones upon hydrolysis, as for instance with sulphuric acid. It describes the preparation of numerous compounds, including 1-phthalimidoanthraquinone, 1, 5-diphthalimido-, 1, 5-diamino-, 1-chloro-5-phthalimino-, and 1-chloro-5-aminoanthraquinones, 4-phthalimido and 4-amino-1-methylamino-2-bromoanthraquinone, 1-phthalimido-2-nitro- and 1-amino-2-nitroanthraquinones.

According to British Patent No. 234,533, January 26, 1924, to Scottish Dyes, J. Thomas and L. J. Hooley, hydroxyanthraquinones and their chloro derivatives suitable for dyeing acetate silk may be prepared by the condensation of phthalic anhydride with *o*-chlorophenol or its derivatives, such as 2, 4-dichlorophenol, in sulphuric acid solution in the presence of boric acid. The hydroxyanthraquinone derivatives are separated by the action of alkalies. For example, chloroquinizarin may be prepared by slowly adding 20 parts of 2, 4-dichlorophenol to 65 parts of 20 per cent oleum while stirring, and cooling to hold the temperature below 25 deg. Cent. (77 deg. Fahr.). When a test sample of this is soluble in a 12 per cent sodium chloride solution, 22 parts of phthalic anhydride, 10 parts of boric acid and 30 parts of 20 per cent oleum are added, and the temperature raised to 180 deg. Cent. in the course of about three hours. It is then raised to about 200 deg. Cent. in an hour and held at 195 to 200 deg. Cent. for about six hours. The solution is then diluted with water and the precipitate extracted with dilute alkali, whereby an insoluble substance which appears to be 1, 4-dihydroxy-2-chloroanthraquinone is obtained as residue. The soluble portion dyes acetate silk a red shade and wool in reddish shades which become bluer on chroming. This may cover Celatene Red B.

In another example, a mixture of 150 parts by weight of 94 per cent sulphuric acid, 30 parts of phthalic anhydride, 16 parts of *o*-chlorophenol and 16 parts of boric acid is heated to 180 deg. Cent. for three hours, the temperature is raised to 200 deg. Cent. for an hour and then maintained at 195 to 200 deg. Cent. for six hours. After cooling, boiling with 3,000 parts of water, and filtering, a quantity of the residual paste equivalent to 10 parts of dry material, is boiled with 1,000 parts of water and 32 parts of ammonia; the insoluble portion is filtered off, and the soluble portion, consisting mainly of 2, 3-chlorohydroanthraquinone, is precipitated by acidification. The portion insoluble in ammonia gives fast orange-yellow shades on acetate silk. This may be either Celatene Yellow, Orange or Golden Orange.

British Celanese, Ltd., in British patent No. 237,943, April 4, 1924, state that unsulphonated nitro derivatives of diarylamines which may or may not contain hydroxyl, amino, or chloro groups, may be applied to acetate silk by the usual dispersal methods of dyeing, printing or stenciling. They may be dissolved in a sulphonated fatty acid, or carboxylic or phenol sulphuric acid, as in British patent No. 219,349 (page 590, Part XIII), to give greenish, golden-yellow, orange and brown shades which are generally of very good fastness to light, soaping, acids, alkalies and ironing. Suitable derivatives include 2, 4-dinitrodiphenylamine, 2, 4-dinitro-4-hydroxydiphenylamine (see British patent No. 222,001, page 591, Part XIII), 4-chloro-4-nitrodiphenylamine, 4-chloro-2-nitro-4-aminodiphenylamine, 4, 4'-dinitro-2'-hydroxydiphenylamine, 4-nitrophenyl-4'-nitro-2'-tolylamine and 2, 4-dinitrophenyl-*B*-naphthylamine. Such compounds usually have no affinity for cotton.

For instance, one hundred pounds of acetate silk may be dyed a full gold shade as follows: Heat 5 pounds of a 20 per cent aqueous paste of 2, 4-dinitro-4-hydroxydiphenylamine with 7.5 pounds of 65 per cent aqueous ammonium sulphoricinoleate until the mass is homogenous. Dilute this with boiling water to make 12 gallons and sieve it into a 200-gallon dye bath. The wet-out acetate silk is then entered and dyed at 65 to 75 deg. Cent. (149 to 167 deg. Fahr.).

Another patent covering the dispersal products is British patent No. 238,936, May 26, 1924, to Scottish Dyes, E. G. Beckett and J. Thomas. It states that acetate silk may be dyed colors which are fast to light by means of aqueous suspensions or colloidal solutions of derivatives (other than amino derivatives) of *a*-hydroxyanthraquinone, which contain at least one other hydroxyl or halogen substituent in the molecule, but not those polyhydroxyanthraquinones which contain two hydroxyl groups in the ortho position to one another. Suitable dyes are 1, 5-dihydroxyanthraquinone (yellow), 1-hydroxy-4-chloroanthraquinone (yellow), 1, 6-dihydroxyanthraquinone (yellow), 1, 4-dihydroxyanthraquinone (orange), leuco-1, 4-dihydroxyanthraquinone (reddish-yellow), 1, 4, 6-trihydroxyanthraquinone (reddish-yellow), and 1, 4, 6-trihydroxy-2-chloroanthraquinone (reddish-yellow).

The British Celanese Company and G. H. Ellis obtained British Patent No. 239,470 on April 4, 1924, covering the dyeing, stenciling or printing of acetate silk by means of aqueous suspensions or colloidal solutions, but not solubilized forms (as in British patent No. 219,349, page 590, Part XIII) of unsulphonated mono-, di-, or poly-nitro derivatives of diarylamines, but excluding 2, 4-dinitrodiarylamines (see British patents No. 237,943 and No. 222,001 on page 591 Part XIII), which may or may not contain hydroxy, chloro, amino, or other substituent groups. Such substances have practically no affinity for cotton and only a slight affinity for silk and wool. They yield shades on acetate silk which generally show very good fastness to light, soaping, acid, alkalies and ironing. Suitable compounds include 4-nitrodiphenylamine, 4-nitrophenyl-4'-tolylamine, 4-chloro-2-nitrodiphenylamine, 4-nitro-4-chlorodiphenylamine, 4-chloro-2-nitro-4'-methyoxydiphenylamine, 4-chloro-2-nitro-4'-hydroxydiphenylamine, 4-chloro-2-nitro-3'-aminodiphenylamine, 4, 4-dinitrodiphenylamine, 4, 4'-dinitro-3'-hydroxydiphenylamine, 4-nitrophenyl-4'-nitro-2'-tolylamine, 2, 4-dinitrodiphenylamine, 4, 4-dichloro-2-nitrodiphenylamine and 4, 4'-dinitro-2'-hydroxyldiphenylamine.

United States patent No. 1,532,921, April 7, 1925, to F. Munz, utilizes ordinary soaps, sulphonated products, Turkey Red oils, monosolvol, etc., as well as organic sol-

vents, such as benzene and its homologous, hydrated carbohydrates, chlorocarbohydrates and similar substances, as solvents for the insoluble products to be applied by the dispersal method. He states that alkalies, such as soda ash and ammonia, frequently assist in solubilizing the dyes.

Method No. 141: For example, Acetate silk may be dyed a yellow shade with 2 per cent. on the weight of the fabric, of dimethylamidoazobenzene, 4 per cent of Turkey Red oil, 4 per cent of solvent naphtha and 0.4 per cent of soda. These are boiled with forty to fifty times their weight of water and added to the dye bath at 80 to 85 deg. Cent. (176 to 185 deg. Fahr.). The acetate silk is dyed for about three-quarters of an hour to exhaust the bath, rinsed and finished in a dilute acetic acid bath.

Method No. 142: A deep black may be obtained on acetate silk with 3 per cent of the dyestuff derived from *o*-anisidine-*a*-naphthylamine, 8 per cent of common curd soap, 5 per cent of tetraline and 1.5 per cent of soda ash. This is handled in the same manner as Method No. 141, but at 60 to 65 deg. Cent. (140 to 149 deg. Fahr.), then diazotized, possibly as in Parts VIII and IX, and developed with *B*-hydroxynaphthoic acid.

Method No. 143: A clear blue color on acetate silk may be obtained in the same manner as in Method No. 142, but using 0.5 per cent of dianisidine, 2 per cent of soap, 1.5 per cent of tetraline and 0.5 per cent of soda ash. This is diazotized and developed with *B*-hydroxynaphthoic acid also.

The use of the Celatene dyes upon wool, silk, straw tagel, jute, coir, hemp, paper pulp, etc., was discussed in "Dyeing Acetate Silk," Part XIV, AMERICAN DYESTUFF REPORTER, 1925, page 622. It is interesting to note that the use of these aminoanthraquinone products upon these fibers is covered by British Patents No. 230,130 and No. 238,590, which follow. These patents indicate a wide and heretofore unsuspected usefulness of the anthraquinone suspensions in dyeing many fibers. British patent No. 230,130, October 29, 1923, to Scottish Dyes, J. S. Wilson and J. Thomas states that natural silk may be dyed with an aqueous suspension of 1-methylamino-, 1-amino-2-methyl-, 2-amino-, 1, 4-diamino-, 1-methylamino-4-amino-, or triaminoanthraquinone. The 1-methylaminoanthraquinone produces a bluish-red color on silk. These products may also be used upon unions containing real silk.

British Patent No. 238,590, April 24, 1924, to R. F. Thompson, J. Thomas and Scottish Dyes, covers the application of similar anthraquinone derivatives to cellulose and ligno-cellulose fibers, such as straw, jute, hemp, esparto, raffia, flax and ramie, but not cotton. These fibers are dyed fast shades by immersion in hot alkaline or acid liquors containing suitable aminoanthraquinones or their derivatives in suspension or in solution. For instance, straw is dyed an orange shade of good fastness to light by treating it for an hour in a boiling alkaline dye bath consisting of 100 gallons of water, 2 pounds of soda ash and 5 pounds of a 10 per cent paste of 1-amino 2-methylanthraquinone. Thirty to forty pounds of jute, hemp, straw or tagel may be dyed a reddish-violet shade of excellent fastness to light by boiling for an hour in a dye bath containing 100 gallons of water, 30 pounds of acetic acid and 10 pounds of a 10 per cent paste of 1, 4-diaminoanthraquinone. Suitable dyestuffs include 1-chloro-2-aminoanthraquinone (yellow), 1-methylaminoanthraquinone, and the nitration product of hexaaminodianthraquinonylthio-ether (blue).

THE "SULPHATO" ACID DYES

A new variety of acid dyes for acetate silk is covered by British patent No. 237,739 to the British Dyestuffs Corporation, W. H. Perkin and S. C. Bate, August 22, 1924. This states that a few of the sulphato dyestuffs, described in British patent No. 181,750, dye acetate silk from a neutral, acid or alkaline bath in a variety of shades of good fastness to light and washing; the nitrated monoazo dyes giving the brightest shades. For example, acetate silk may be dyed a bright scarlet by immersion for an hour at 60 to 80 deg. Cent. (140 to 176 deg. Fahr.) in a dye bath containing 3 per cent of salt, 1 per cent of sulphuric acid and 1 per cent of the dyestuff obtained by coupling diazotized *p*-nitroaniline with sodium sulphatoethylaniline. Sulphato dyestuffs containing amino groups, that is, *p*-aminobenzeneazo-*p*-sulphatoethylaniline, may be used and the resulting shades subsequently diazotized and developed by the usual methods. Two-color effects on union materials containing cotton and acetate silk are obtained by dyeing in one bath with sulphato dyestuffs having an affinity for either, but not both of the fibers. Suitable sulphato dyes for acetate silk are obtained by coupling *m*-nitroaniline with sulphatoethylaniline (reddish-yellow), or ethylsulphatoethylaniline (yellowish-orange); *p*-nitroaniline with sulphatoethylaniline (reddish-orange), or sulphatoethyl-*o*-toluidine (bright red), or ethylsulphatoethylaniline (scarlet), or sulphatoethyl-*B*-naphthylamine (bright pink), or sulphatoethyl-*a*-naphthylamine (magenta); 1-nitro-2-naphthylamine with methylsulphatoethylaniline (orange); 4-nitro-1-naphthylamine with ethylsulphatoethylaniline (brown); or 3, 5-dinitro-*o*-toluidine with ethylsulphatoethylaniline (cardinal red). *o*-Chloro-*p*-nitroaniline with ethylsulphatoethylaniline (bluish-red), or sulphatoethyl-*a*-naphthylamine (bright violet); 2, 4-dinitroaniline with benzylsulphato-ethylaniline (bluish-red), or sulphatoethyl-*a*-naphthylamine (navy blue); and 2, 4-dinitro-1-naphthylamine with sulphatoethyl-*a*-naphthylamine (greenish-blue).

The original patent covering the new "sulphato" dyes was British patent No. 181,750 (1922), to the British Dyestuffs Corporation, Green and Saunders, and was based upon the discovery that the presence of the alcoholic sulphuric group, $—C_2H_4.SO_4H$, attached to nitrogen has a somewhat similar function to the sulphonic acid group in dyes. The resulting dye is soluble, acid in character, and therefore suitable for dyeing real silk and wool. Apart from the part that these properties are characteristic of these new dyes, their use is not restricted

to the dyeing of animal fibers, as it was originally recognized that some of them would dye cotton from a neutral or alkaline dye bath, while others may be used in the manufacture of lakes and pigments. Members of this group suitable for use as mordant dyes were also prepared. Now it has been discovered that certain dyes of this class are suitable for acetate silk, so that it may be possible to dye almost any combination of fibers in certain colors with this one class of dyes.

The "sulphato" group (SO_4H), like the sulphonic group, can be introduced not only into the finished dye, but also into one or both components used in its production. There is also another quite distinctive method to react in aqueous or alcoholic solution with a primary or secondary amine or diamine of the aromatic or fatty-aromatic series, or one of their derivatives, so that an intermediate product containing the hydroxyethyl residue ($—C_2H_4.OH$) is formed. This product is then converted into a hydroxyethyl dyestuff, which, on subsequent treatment with concentrated sulphuric acid, yields the required soluble dyestuff containing the sulphato group attached to the ethyl residue. Other chlorhydrins may may be used in the same manner, and if desired, a sulphonic acid group may be introduced at the same time as the sulphato, however, this would possibly not be desirable in products for use in dyeing acetate silk.

A modification of the foregoing method consists of first forming the chlorethylhydrogen sulphate by dissolving ethylene chlorhydrin in concentrated sulphuric acid, and allowing this substance to react in neutral or alkaline solution with a solution of a dyestuff component, intermediate product, or a dyestuff containing a primary or secondary amino group. In this manner the sulphatoethyl group may be introduced by a single step. When ethylene chlorhydrin is used in the preparation of the sulphato intermediate product, the general structure of the monoamino derivative is:

$$\begin{matrix} R \\ A \end{matrix}\!>\!N—C_2H_4.SO_4H \quad \text{or} \quad R—N\!<\!\begin{matrix} C_2H_4.SO_4H \\ C_2H_4.SO_4H \end{matrix}$$

in which R indicates an aromatic, or substituted aromatic residue, and A represents a hydrogen atom or an alkyl, oxyalkyl or aryl group. An aromatic diamine may be converted into a mono-, di-, tri-, or tetra-sulphato acid.

To convert the hydroxyethyl intermediate compound into its sulphato acid, it is only necessary to use sulphuric acid, or a substitute, of the same concentration as is used in the preparation of ethylhydrogen sulphate, the general conditions being the same in both cases. The resulting product may be used for the direct preparation of a sulphato dye.

Parent basic dyestuffs are prepared from their hydroxylethyl components in a manner similar to that used for the corresponding dyes from ethyl- and diethylanilines. ethyl-*o*-toluidine, ethyl-*a*- and *B*-naphthylamines, dialkyl-*m*-phenylenediamines, etc. They are then treated with sulphuric acid. Both of the foregoing methods are applicable to all classes of dyes in which the members can be obtained as the corresponding ethyl derivatives.

In the same manner, sulphato triphenylmethane dyes can be obtained by condensing from suitable aldehydes, while all types of dyes obtainable from nitroso compounds by condensation with amines, phenols, or aminophenols, can be prepared from nitroso sulphato acids; or a hydroxyethyl azine, oxazine, or thiazine dye may be converted into its sulphato acid. It is possible that prior to this invention sulphato compounds have been prepared but not recognized.

As an example of the preparation of these dyes, the sodium salt of *p*-nitrobenzeneazo-*p*-disulphatodiethylaminobenzene is prepared by adding to a solution of 23.1 parts of the sodium salt of disulphatodiethylaniline, a solution containing ten parts of diazotized *p*-nitroaniline. Coupling takes place in the presence of acetic acid and the dye is salted out. It is a red powder which dyes wool scarlet from an acid dye bath and has the formula:

$$C_6H_4(NO_2).N_2.C_6H_4.N(C_2H_4.SO_4NA)_2$$

The same dyestuff may be prepared in another manner by dissolving 12.3 parts of dihydroxyethylaniline in dilute acid and coupling it with the diazo solution prepared from 10 parts of *p*-nitroaniline.

The insoluble red powder is dried and 1 part is heated with 2 or 3 parts of concentrated sulphuric acid at about 30 to 100 deg. Cent. until it is soluble in dilute alkali. The melt is then diluted and the dye salted out as before.

The sodium salt of disulphatodiethylditolylphenylcarbinol may be prepared by slowly adding 10 parts of the dyestuff obtained according to British patent No. 13,604 (1914) (by condensing benzaldehyde with oxyethyl-*o*-toluidine and subsequent oxidation with lead oxide) to 20 or 30 parts of cold concentrated sulphuric acid, keeping the temperature down. The solution is allowed to stand until the product is soluble in alkali. On dilution and salting out, a dyestuff is obtained which dyes wool greenish-blue from an acid dye bath. The leuco base may be sulphonated before oxidation to the carbinol. This dye has the formula:

$$C_6H_5.C(OH)\!<\!\begin{matrix} C_6H_3(CH_3).NH.C_2H_4.SO_4Na. \\ C_6H_3(CH_3).NH.C_2H_4.SO_4Na. \end{matrix}$$

Sulphatoethylaminodioxytoluphenoxazoniumcarboxylic acid,

$$(C_2H_4SO_4Na).NH.C_6H_2(CH_3\!<\!\begin{matrix} N \\ O———— \end{matrix}\!>\!C_6H(OH)_2.CO_2.$$

may be prepared from a dyestuff of the gallocyanine type. This gallocyanine dye is prepared by the usual method from *p*-nitrosooxyethyl-*o*-toluidine and gallic acid, see British patent No. 182,031 (1921). Ten parts of this dye are added to twenty or thirty parts of concentrated sulphuric acid and the solution warmed until it gives no precipitate in a tannin reagent. It is then diluted and the dyestuff salted out as a black powder which dyes wool a deep blue from an acid dye bath and chrome mordanted wool a violet blue.

(Part VIII will appear in an early issue)

Foreign Dyes Imported Through New York and Other Ports During January

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS OF MANUFACTURERS' NAMES

1—THE SIX LEADING GERMAN COMPANIES

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873.
B—Badische Anilin-und-Soda-Fabrik, Ludwigshafen-on-the-Rhine. Founded 1865.
By—Farbenfabriken, vormals Friedr. Bayer & Co., Leverkusen-on-the-Rhine. Founded 1862.
C—Leopold Cassella & Co., Frankfort-on-the-Main. Founded 1870.
K—Kalle & Co., A. G., Biebrich-on-the-Rhine. Founded 1870.
M—Farbwerke, vormals Meister Lucius & Bruning, Hochst-on-the Main. Founded 1862.

2—THE SMALLER GERMAN COMPANIES

BK—Leipziger Anilinfabrik Boyer & Kegel, Furstenberg. near Leipzig. Founded 1882.
CG—Chemikaliewerk Griesheim G. m. b. H., Griesheim-on-the-Main. Founded 1882.
CJ—Carl Jager G. m. b. H., Anilinfarbenfabrik, Dusseldo-f. Founded 1823
GrE—Chemische Fabrik Griesheim-Electron, Offenbach-on-the-Main. Founded 1842.
L—Farbwerk Mulheim, vormals A. Leonhardt & Co., Mulheim-on-the-Main. Founded 1879
tM—Chemische Fabriken, vormals Weiler ter Meer, Uerdingen-on-the-Rhine. Founded 1877.
WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—SWISS COMPANIES (ALL AT BASEL)

DH—Farbwerke vormals L. Durand, Huguenin & Co. Founded 1871.
G—Anilinfarben-und Extract-Fabriken, vormals Joh. Rud. Geigy. Founded 1764.
I—Gesellschaft fur chemische Industrie. Founded 1885.
S—Chemische Fabrik, vormals Sandoz & Co. Founded 1887

4—DUTCH AND FRENCH COMPANIES

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888
NF—Niederlandische Farben-und-Chemikalienfabrik Delft, Delft, Netherlands. Founded 1897.
CN—Compagnie Nationale de Matieres Colorantes et Produits Chimiques. Founded 1917. (Etablissements Kuhlmann merged with this company in 1923.)
P—Societe Anonyme des Matieres Colorantes et Produits Chimiques St. Denis (formerly A. Poirrier). Founded 1830.

5—ENGLISH COMPANIES

Bro—Brotherton & Co., Ltd., City Chambers, Leeds.
BAC—British Alizarine Co., Ltd., Manchester
BD—British Dyestuffs Corporation, Ltd., London.
Cl Co.—The Clayton Aniline Co., Ltd., Clayton, Manchester.
CV—The Colne Vale Dye & Chemical Co., Ltd., Milnsbridge, Huddersfield.
Hol—L. B. Holliday & Co., Ltd., Huddersfield.
Scot—Scottish Dyes, Ltd., Grangemouth.

IMPORTS of coal-tar dyes for the month of January, 1926, by ports are as follows:

	Pounds	Invoice Value.
New York	179,985	$177,319
Boston	10,474	6,699
Total	190,459	$184,018

The January total for dyes does not include the warehouse withdrawals for the port of New York, details for which will be in the February import list. As the withdrawals comprise a considerable portion of the totals, the figures for January are below the actual imports for that month.

Five Leading Dyes, by Quantity, Imported During January

	Pounds
Ciba Violet R (single strength)	17,630
Ciba Scarlets (single strength)	15,285
Cross Dye Green B, 2G	8,838
Helindone Red 3B (single strength)	6,133
Trisulphon Brown GS	5,004

Dyes and Intermediates Remaining in Bonded Customs Warehouse

	Coal-Tar Dyes and Colors (pounds)	Coal-Tar Intermediates (pounds)
July 31, 1925	775,916	1,378,837
August 31, 1925	767,431	1,363,760
September 30, 1925	709,381	1,359,717
October 31, 1925	609,750	1,055,241
November 30, 1925	521,238	746,226
December 31, 1925	633,525	758,618

Per Cent of Dyes by Country of Shipment

Switzerland	50	Belgium	3
Germany	27	Canada	1
France	11	Italy	1
England	6	Holland	1

The dyes in this report are grouped by both Colour Index and Schultz numbers, and, in the case of those which could not be identified by either number, the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single strength basis.

DYES OF COAL-TAR ORIGIN*

Colour Index No.	Schultz No.	Name of Dye and Mfr.	Quantity (pounds)
24	36	Moti Orange—(t-M)	50
31	42	Erio Floxine 2G—(G)	110
145	140	Jasmine, High, Conc.(G)	93
196	175	Acid Ponceau E—(G)	220
219	—	Eriochrome Flavine A Conc.—(G)	1,102
278	—	Direct Fast Red 8BL—(By)	
		Chlorantine Fast Red 7BL—(I)	881
289	257	Coomassie Navy Blue GNX—(BD)	300
321	—	Diamine Fast Scarlet GG—(C)	50
324	—	Developed Brilliant Orange GR Ex.—(By)	249
325	—	Diamine Fast Violet FFRN—(C)	100
326	279	Direct Fast Orange S—(By)	150
382	319	Chloramine Red B—(S)	2,000
423	349	Diamine Brown B—(C)	150
436	358	Aceto Purpurine 8B—(A)	200
441	—	Chromocitronine R—(DH)	440
448	363	Cotton Red 4BX—(B)	500
459	373	Diamine Orange F—(C)	2,000
570	454	Trisulphon Brown GS—(S)	5,004
590	471	Chloramine Blue 3G—(S)	506
645	—	Kiton Fast Yellow 3G—(I)	661
663	500	Setocyanine 396—(G)	110
671	505	Erioglaucine Supra Conc.—(G)	110
677	512	Magenta AB Powder—(B)	1,500
682	500	Ethyl Violet—(B)	500
690	522	Victoria Violet 4R—(I)	331
704	536	Alkaline Blue 3R—(C)	25
705	537	Methyl Silk Blue New—(G)	110
707	539	Water Blue, large lumps—(A)	200
710	541	Brilliant Dianil Blue 6G—(M)	400
712	543	Patent Blue V—(M)	450
717	548	Acid Violet 6BN—(I)	2,204
720	551	Oxychrome Brilliant Blue PB—(A)	200
722	553	Eriocyanine RC—(G)	110
728	558	Victoria Blue 4R—(I)	771
729	559	Victoria Blue B—(I)	2,204
743	570	Rhodamine S—(IG)	50
748	579	Sulpho Rosazeine B Extra—(M)	200
749	573	Rhodamine B Conc.—(G)	
		Rhodamine B Extra—(Q)	2,200
758	582	Erio Fast Fuchsine BBL—(G)	2,204
773	592	Erythrosine A—(M)	11
788	603	Acridine Orange DHE—(DH)	
		Brilliant Acridine Orange A—(DH)	2,866
789	—	Patent Phosphine 2G, M—(I)	1,653
795	607	Runic AL Conc.—(B)	500
797	608	Patent Phosphine GRNTN—(B)	850
801	613	Quinoline Yellow—(G)	118
815	618	Basic Yellow T—(C)	500
829	673	Azo Orseille BB—(C)	1,000
833	—	Xylene Milling Blue BL Conc.—(S)	
		Xylene Milling Blue GL Conc.—(S)	1,551
845	687	Methylene Heliotrope Extra Strong (M)	500
865	700	Silver Gray P—(A)	25
873	681	Direct Gray R Paste—(G)	991
875	923	Fur Black DB, DG, SC—(A)	
		Fur Blue Black A, B, D, SA, SB, SDF—(A)	
		Fur Blue Gray—(A)	
		Fur Brown NZ, NZD, O, P, PR, PY—(A)	
		Fur Brown 2R, 4R, SK, SKG, SO, SP—(A)	
		Fur Gray AL, ALA, B, G, R—(A)	
		Fur Gray Brown SLA—(A)	
		Fur Olive DA, 3G, 6G—(A)	
		Fur Red Brown 6R—(A)	
		Fur Yellow 2G, 4G, 6G—(A)	
		Fur Yellow Brown A, 2GA, 4GL—(A)	
		Nako ER—(M)	
		Nako Black ST—(M)	642
878	622	Brilliant Delphine Blue B—(S)	1,000
879	—	Chromazurine E—(DH)	882
884	627	Chromacetine Blue S Extra—(DH)	
		Gallo Navy Blue S Extra—(By)	885
892	635	Modern Violet—(DH)	882
894	637	Gallamine Blue Extra Paste—(G)	1,024
905	645	Gallazine Powder—(DH)	441
927	663	New Methylene Blue N—(M)	
		New Methylene Blue NSS—(C)	1,550
937	—	Eclipse Brown 3GK—(G)	50
969	748	Hydron Blue R Powder (s. s.)—(C)	333
1006	746	Pyrogene Green 3G—(I)	1,102
1053	—	Alizarine Light Blue SE Conc.—(S)	
		Erio Fast Cyanine SE—(G)	1,151
1054	858	Alizarine Sapphire Blue B—(I)	661
1063	790	Anthracene Blue SWR Powder—(B)	2,574
1081	864	Anthraquinone Green GXNO Powder—(B)	594
1088	855	Alizarine Blue SKY Powder—(By)	
		Alizarine Sky Blue B Powder—(By)	738
1091	—	Anthra Rubine B Powder—(K)	143
1095	759	Anthra Yellow GC Paste—(B)	661
1096	760	Vat Golden Orange C Dbl. Pst. (s. s.)—(B)	1,322
1102	765	Helindone Black IBB Dbl. Pst. (s. s.)—(M)	1,000
1113	842	Indan. Blue GCD Dbl. Pst. (s. s.)—(B)	
		Indan. Blue GCD Dbl. Pdr. (s. s.)—(B)	3,276
1118	849	Indan. Yellow G Dbl. Pst. (s. s.)—(B)	2,010
1133	819	Vat Red FF Extra Paste—(By)	1,450
1142	830	Anthra Red RT Paste—(B)	
		Anthra Red RT Paste Fine—(B)	
		Anthra Red RT Dbl. Paste (s. s.)—(B)	
		Anthra Red RT Dbl. Pst. Fine (s. s.)—(B)	264
1143	827	Anthra Bordeaux R Paste—(B)	605
1145	834	Helindone Gray IGK Pdr. (s. s.)—(M)	800
1149	873	Helindone Brown IGR Pdr. (s. s.)—(M)	225
1151	—	Vat Printing Brown R Pdr. (s. s.)—(By)	80
1161	871	Vat Red Violet RRK Paste—(B)	1,445
1163	832	Vat Violet BH Paste—(B)	1,293
1178	876	Indigosol O, O4B—(DH)	330
1196	890	Ciba Yellow G Paste—(I)	440
1198	891	Ciba Green C Powder (s. s.)—(I)	2,200
1211	910	Helindone Pink BN Paste—(M)	1,500
		Thioindigo Rose BN Extra Paste—(K)	1,532
1212	918	Ciba Red 3B Powder (s. s.)—(I)	
		Helindone Reddish Violet IRH Powder (s. s.)—(M)	
		Thioindigo Red 3B Paste—(K)	
		Thioindigo Red 3B Powder (s. s.)—(K)	6,133
1217	913	Helindone Orange R Paste—(M)	
		Helindone Orange R Powder (s. s.)—(M)	
		Thioindigo Orange R Paste—(K)	3,674
1222	901	Ciba Violet R Paste—(I)	
		Ciba Violet R Powder (s. s.)—(I)	17,630
1226	906	Ciba Red G Powder (s. s.)—(I)	2,200
1227	904	Helindone Brown G Paste—(M)	500
1227	904	Thioindigo Brown G Paste—(K)	1,017
1228	907	Ciba Scarlet G Extra Paste—(I)	11,683
1228	907	Helindone Fast Scarlet C Paste—(M)	1,500
1228	907	Thioindigo Scarlet 2G Paste—(K)	2,102
1230	911	Ciba Orange G Paste—(I)	661

*This table includes imports through the port of New York to the amount of 179,985 pounds, and also 10,474 pounds through the port of Boston.

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Acid Blue RBF—(I)	551
Acid Pure Blue R Supra—(G)	1,102
Acid Red G Conc.—(Q)	110
Acid Rhodamine B Powder—(M)	55
Acid Rhodamine 3R—(I)	1,102
Acid Violet 10B—(B)	25
Alizarine Supra Blue SES—(By)	10
Azo Brilliant Red B—(M)	100
Brilliant Milling Blue B—(By)	551
Cloth Fast Orange R—(I)	331
Cloth Fast Red 3B—(I)	110
Erio Anthracene Brown R—(G)	220
Erio Green B Supra—(G)	1,102
Fast Acid Green BB Extra—(M)	500
Indocyanine B—(A)	3,508
Kiton Fast Red 4BL—(I)	110
Kiton Fast Red R—(I)	441
Lanasol Blue R—(I)	110
Milling Red 4BA, 6BA—(A)	700
Naphthol Black BGN Conc.—(C)	100
Neolan Blue 2G—(I)	2,204
Neolan Yellow GR—(I)	551
Novazol Blue B—(G)	441
Polar Orange R Conc.—(G)	2,204
Polar Yellow 2G Conc.—(G)	2,204
Radio Navy Blue B—(C)	50
Silk Blue BSIC Powder—(A)	100
Sulphorhodamine G Powder—(M)	288
Supramine Green BL—(By)	5
Xylene Fast Blue FF Conc.—(S)	500
Xylene Milling Orange R Conc.—(S)	1,000

Vat Dyes

Anthra Brilliant Green 5G Paste—(B)	661
Ciba Blue 2RH—(I)	110
Ciba Pink BG Paste—(I)	1,323
Helindone Fast Scarlet B Paste—(M)	500
Helindone Fast Scarlet C Powder—(M)	100
Helindone Pink R Extra Paste—(M)	2,000
Helindone Printing Black RD Paste—(M)	3,500
Hydron Orange RP Paste—(C)	2,274
Hydron Yellow Brown G Paste—(C)	500
Indigosol Yellow HCG—(By)	10
Thioindigo Black B Paste—(K)	2,053
Vat Blue RSN Powder—(B)	50
Vat Brown GG Paste—(B)	1,584
Vat Green 2G Double Paste (s. s.)—(B)	1,322
Helindone Pink IB Double Paste (s. s.)—(M) Vat Pink B Paste—(B)	1,429

Mordant and Chrome Dyes

Acid Alizarine Gray G—(M)	1,866
Alizarine Sky Blue G—(By)	10
Anthracene Chromate Brown EB—(C)	500
Chromorhodine 6GN Extra—(DH)	220
Eriochrome Brown SWN Supra—(G)	55
Metachrome Blue Black 2B—(A)	264
Metachrome Red G—(A)	200
Shoddy Chrome Black BA—(A)	5
Shoddy Chrome Black RA—(A)	5
Shoddy Chrome Black TA—(A)	5

Direct Dyes

Benzo Fast Blue 4GL Extra—(By)	220
Benzo Fast Copper Brown 3GL—(By)	10
Chloramine Light Violet R—(S)	500
Chlorantine Fast Blue 4GL—(I)	861
Chlorantine Fast Blue 8GL—(I)	1,102
Chlorantine Fast Green B—(I)	2,204
Chlorantine Fast Yellow RL—(I)	1,102
Columbia Catechine 3B—(A)	50
Cotonerol G Extra, 2G Extra—(A)	20
Developing Black ED—(C)	500
Diamine Azo Fast Green G—(C)	936
Diamine Azo Brown G—(C)	487
Diamine Fast Blue FFB—(C)	25
Diamine Fast Rose B—(C)	100
Diaminogene GG—(C)	1,442
Diazanil Pink B—(M)	250
Diazo Brilliant Scarlet B Extra—(By)	298
Diazo Brown RW—(I)	110
Diazo Fast Blue 6GW—(I)	1,102
Diazol Light Red N8B—(P)	2,203
Oxydiamine Blue PG—(C)	50
Parasulphon Brown GS—(S)	200
Triazol Light Orange 2RL—(GrE)	123
Zambesi Black D—(A)	500

Dyes for Artificial Silk

Azonine Direct Blue B—(C)	500
Celatene Black—(SD)	50
Duranol Black Paste—(BD)	200
Duranol Blue G Paste—(BD)	172
Duranol Red 2B Paste—(BD)	60
Duranol Red G Paste—(BD)	224
Ionamine A—(BD)	260
Setacyl Direct Orange 2R Powder—(G)	220
Setacyl Direct Red B—(G)	441

Basic Dyes

Brilliant Acridine Orange 3R—(DH)	110
Rhodamine Blue 6B Conc.—(By)	55

Sulphur Dyes

Cross-Dye Green B—(BD)	4,575
Cross-Dye Green 2G—(BD)	4,263
Immedial Direct Blue B—(C)	100
Indo Carbon SN—(C)	50
Pyrogene Pure Blue 3GL—(I)	1,102
Sulphur Black MBWJ—(A)	5

Spirit-Soluble and Color-Lake Dyes

Ceres Red V—(By)	3
Hansa Yellow G Powder—(M)	500
Oil Green ALB in lumps—(K)	50
Tero Yellow FR—(B)	200

Unclassified Dyes

Azol Printing Brown 3RL Paste—(By)	10
Neutral Orange G—(By)	558
Selan Printing Brown 3R—(By)	10

It is reported that Col. Leroy Springs, president of the Fort Mill Manufacturing Company, Fort Mill, S. C., is considering the question of producing rayon goods in that plant. The erection of about 100 new houses for operatives of the local mill is also said to be under consideration.

Technical Notes from Foreign Sources

Steaming of Ciba Coloring Matters

The proportion of moisture in the steam plays an important part in the steaming of Ciba coloring matters. According to Der Textilchemiker und Colorist, 1925, page 162, the author has established that the best results can be obtained when the steaming is conducted with a steam which contains considerable moisture, the process being effected in as short a possible time, from five to ten minutes, in a Mather-Platt apparatus. The greater the proportion of moisture in the steam the deeper and the more brilliant will be the color.

In order to obtain the proper degree of moisture in the steam and to regulate this so that it is constant, the author proceeds in the following manner. He arranges a Foulard in front of the Mather-Platt machine. The Foulard is provided with two rollers. One of these, the upper one, is covered with rubber, and the lower one is made from engraved copper and dips into a solution of gum tragacanth and glycerine. The excess of the solution is removed by a doctor.

This Foulard machine makes it possible to impregnate the printed fabric with the thickened solution mentioned above. Directly after this takes place, the fabric enters the Mather-Platt machine, and its movement through this machine is also under control. The designs were printed on the fabric with the aid of Alizarine Indigo Blue (pulverized) Bayer, glycerine, water, caustic soda, hydrosulphite (pulverized) MLB, gums, rongalite and British gum.

The first sample was steamed without being first put through a moistening process. The second sample was steamed after first being treated with the aforementioned mixture. The third sample was first subjected to the action of a solution of beta-naphthol in sodium hydroxide and then steamed.

It was then found that the first sample was not as good as the other two. The third sample appeared to be better than the second. Patents have been taken out in the past on the action of beta-naphthol under such conditions on vat and sulphur coloring matters.

Manufacture of Piece Dyed Mixtures of Wool and Half Wool

In the article which is published on this subject in Deutsche Wollen Gew., 1925, page 449, the author first describes the known processes employed for the production of piece dyed mixtures of wool and half wool, and in particular he mentions a process which was patented in the year 1907 and which dealt with the dyeing in an acid bath of woven fabrics which consisted of animal fibers either in part and in entirety. In this process substantive coloring matters were used in combination with wool colors.

A number of formulae are also given in the article according to which it is possible to manufacture cheap fabrics and the like, dyeing them in a single color bath. It was mentioned that for this purpose it has been found that the acid coloring matters are best suited, and these colors will be absorbed by wool in a neutral solution which also contains Glauber salt.

In the case of certain cheap fabrics and knitted cloth which are made from cotton and shoddy it is found necessary to add to the color bath in addition to the acid coloring matter already contained in it a substantive coloring matter as well in order to dye the cotton part of the fabric. It is found that the latter color will be easily absorbed from a neutral, lukewarm solution.

In order to produce black-white mixtures in the coarse cheap fabric, it is necessary to weave part of the fabric from white cotton and part from black shoddy to which a corresponding amount of white wool has been added. Various other data regarding this matter are given in the original article.

Dyeing of Chiffon

Silk chiffon is made mostly from raw silk, so that it must first be boiled in order to remove the silk glue that is contained in it. For this purpose the silk is given two treatments which follow one after the other. In the first place it is treated in a soap bath which contains from 30 to 35 per cent of soap. The temperature of this soap has been passed through this bath, it is then washed well with clean water. In handling the very finest grades of chiffon silk, in which the greatest of care must be taken in the treatment, it is customary to stretch the fabric on a frame and treat it while in this condition. In the dyeing of the fabric the direct and acid coloring matters are the ones that are mostly used, while the basic coloring matters are employed on lower grade products. (Textile Manufacturer, 1925, page 171.)

Artificial Substances from Cellulose Derivatives

Cellulose xantho-fatty acid, or a salt of this acid, is used in the manufacture of articles or products such as coatings, finishes, sizes, artificial leather, cements, thickening agents for pigments in textile printing, plastic compositions, films and artificial threads. The cellulose derivative is used in the form of a solution in water or an aqueous solution of a volatile organic or inorganic base, such as ammonia, a primary, secondary or tertiary amine of the aliphatic or aromatic series, a poly-amine, a quaternary base of acyclic or cyclic structure, or a member of the guaniline, pyridine, or quinoline group. With this solution there may also

be admixed other colloids, and also softening agents such as albuminous substances, gelatin, amyloid, starch and the like, dextrin, gums, tragasol, glycerine, di-glycerine, polyglycerine, glycols, sugars, syrups, soaps, fats, oils and ammonium and alkali metal compounds of fatty sulphonic acids such as Turkey Red oil.

Textile fabrics of vegetable or animal origin are finished by the application of a solution of a cellulose xantho-fatty acid in water or in an aqueous solution of aniline, ammonia, or pyridine, and to which is added a filling material, such as zinc white, china clay, or talc, or a softening agent such as Turkey Red oil or a drying or non-drying oil or a soap, or another colloid such as a solution of starch, the coated fabric being subsequently dried and either heated or steamed, or washed, with an aqueous solution of aniline or toluidine. (British patent No. 231,805.)

Printing Textiles with Metallic Powders

Textile materials are printed to give imitation gold effects. For this purpose there is employed a paste which consists of gold powder suspended in a solution prepared by heating 20 kilograms of colorless gelatin and 80 liters of water for one hour under a pressure of half a kilogram per square centimeter. Solidification of the printing paste is avoided by heating the printing roller to a temperature which exceeds 35 deg. Cent. The printed effects are made fast to washing and soaping by after-treatment with formaldehyde.

Deposition of gold powder within the printing paste on standing is avoided by the use of a more viscous solution of gelatin which is prepared by heating 600 kilograms of gelatin and 4,000 liters of water for eight hours in an autoclave under a pressure of 2 kilograms per square centimeter.

Metallic powders are printed together with vat dyes, such as the example, algols, helindones, and indanthrenes, on fabrics which are dyed with a ground capable of being discharged by means of hydrosulphite.

It is claimed that the gelatin solution which is used above may be stored without danger of decomposition.

For further details see Bulletin Societe Muhlhouse, 1925, 91, pages 469-470.

Recognition and Testing of Colors

In the German journal, Der Textilchemiker und Colorist, 1925, numbers 1, 2, 3, 4, 5 and 6, there is contained a detailed discussion of methods used in identifying coloring matters and testing them, as developed in the laboratories of the School for Dyeing in Barmen. In the first installment of this series which is continued from the previous year there are discussed the benzidine coloring matters, their recognition, use and properties. Then the sulphur colors are taken up, those that are employed in direct dyeing as well as in dyeing with basic colors. In the fourth group there are included different individual coloring matters, such as Turkey Red oil with the similar alizarine and anthracene dyestuffs, Catechu Brown, Logwood Black, Aniline Black and several mineral coloring matters, which are produced on the fiber, such as Chrome Yellow, Chrome Orange and Rust Yellow. The fifth group of colors includes Indigo and Indigo Blue and the sixth group the vat coloring matters. The seventh group contains the ice colors and the eighth the Naphthol AS colors. Details are also given of methods for testing the textile fibers themselves and identifying them.

Dyeing Cottons of Different Growths

In the Journal of the Textile Institute appears an article in which are described the results obtained by making a comparison of the shades obtained of cottons of different growths when they are dyed together in the same bath.

Different growths (Indian and American) of bleached cotton dye to different shades, that is, depths of shades, when dyed together with direct colors, such as Chlorazol Black BH, vat coloring matters such as Alizanthrene Blue, or sulphur coloring matters such as Thionol Brown GD. The depths of the resulting shades are approximately proportional to the hair weight per centimeter, and therefore the wall thickness of the cotton fibers (see Clegg, Berichte, 1924, page 88). Dead cotton hairs which have abnormally thin walls resist coloring matters almost completely. Egyptian and Sea Island cotton hairs, usually thin walled, dye to comparatively lighter shades as compared with the coarser American and Indian cottons.

No relationship exists between the dyeing properties of cotton hairs and their absorption of Methylene Blue. Variation in the twist of the yarn affects its shade of dyeing, the difference in shade produced by a variation of two turns per inch in American cotton yarn of 20s count being distinctly noticeable.

Nature of Vat Dyeing on Cotton

The affinity of the vat coloring matter acids and their alkali salts for cotton was examined in an apparatus enabling the dyeing process to be carried out in an atmosphere of any desired gas. Dyestuffs of the indanthrene class were chosen, and it was found that while the color acids have a stronger affinity for cellulose and are fast to boiling soap solution in an atmosphere of carbon dioxide, the corresponding alkali salts have not such affinity and are washed out of the fiber by soap solution or water. When the fiber, impregnated with the color acids is subjected to air oxidation, the dye formed has a deeper shade than that produced by the usual method.

Fast colors are obtained only through the intermediate formation of a cellulose color acid compound. In the usual process the color acid is first liberated by the action of atmospheric carbon dioxide and is then oxidized, but the quantity of carbon dioxide in the air does not suffice to produce as deep a shade as in

the experimental dyeing in an atmosphere of carbon dioxide. The blue leuco compound of Indanthrene Yellow becomes green in boiling soap solution, and this green leuco compound is stable in air and is not completely oxidized even by sodium hypochlorite. (Z. angew. Chem., 1925, 853-7.)

NEWPORT ANNOUNCES NEW SULPHUR BLUES

The latest leaflet distributed by the Newport Chemical Works to holders of the Newport binder describes the properties of two new sulphur blues: Newport Sulphur Blue NRH and Newport Sulphur Blue DGN, described as direct dyeing blues which do not require special oxidation to develop their shades.

These colors are said, further, to be of excellent solubility, and of particular value for the dyeing of cotton in every stage of manufacture in all types of machines. The shades, it is stated, do not bronze, and possess excellent general fastness properties.

The leaflet exhibits these colors on swatch bows and gives their method of application and special fastness properties.

SANDOZ CHEMICAL WORKS MOVE

The Sandoz Chemical Works, Inc., of 240 Water Street, New York City, will move on February 23 to quarters at 708-710 Washington Street. Both laboratory and office will in the future be located at this latter address. The new telephone number is Chelsea 7853 to 7858, inclusive.

NEW PONTACHROME BLACK

The Dyestuffs Department of E. I. du Pont de Nemours & Co. announce the addition of Pontachrome Blue Black BB to their line of wool colors.

When dyed afterchrome this product is said to give deep blue blacks of excellent fastness to light, rubbing, fulling, potting, scouring, alkalies and perspiration. It is described as exceedingly level dyeing, is said to penetrate well and is suitable for machine dyeing. The best results can be obtained by the top-chrome method, but it can also be used chrome mordant, and for this reason is suitable for use on wool in all stages of manufacture and is particularly suitable for dyeing slubbing. It is also recommended for vigoureux printing. It leaves cotton and rayon effect threads unstained.

With an Italian firm offering artificial wool to American textile manufacturers, there is inviting chance to cut the overhead in the ancient game of pulling-the-wool-over-the-eyes, for now the confidence men can play it synthetically. It may turn out that the only myth about the Golden Fleece was that it was artificial wool.—Nation's Business.

WOOLEN AND WORSTED DYER

With mill training; conversant with all kinds of woolen machinery and full knowledge of chrome and acid dyestuffs and their application to all fabrics. For mill demonstrator in New England; located at Providence. Reply to Box 327, American Dyestuff Reporter.

DYESTUFF OVERSEER

Wanted—Dyestuff overseer, thoroughly familiar with the handling and dyeing of piece goods, including glove silk, wide tubular and woven broad silk goods. Must be real live man capable of getting quality and production, able to handle and train labor and generally organize a dyehouse to run economically. State age, experience and salary required to Box 328, American Dyestuff Reporter.

PRINT WORKS CHEMIST

Textile print works chemist-colorist desires position as such or as superintendent or assistant. Over twenty years' experience. Best references. Address replies to Box 329, American Dyestuff Reporter.

LABORATORY ASSISTANT

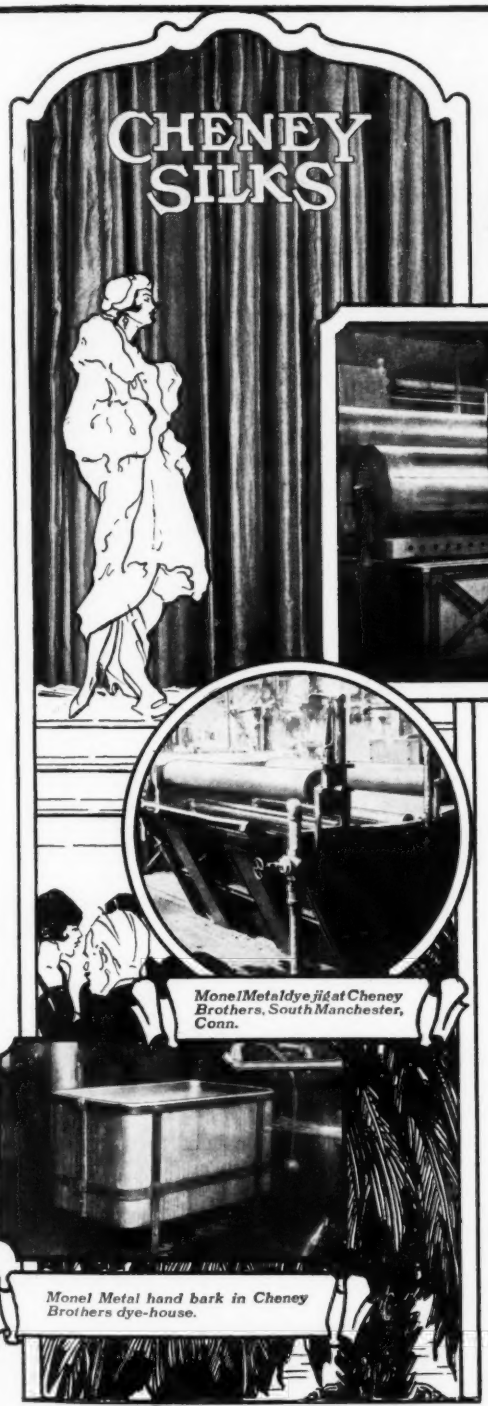
Wanted—Thoroughly experienced laboratory assistant for large color and chemical house. State full particulars, experience, salary, etc. Address Box 330, American Dyestuff Reporter.

DYEHOUSE OVERSEER

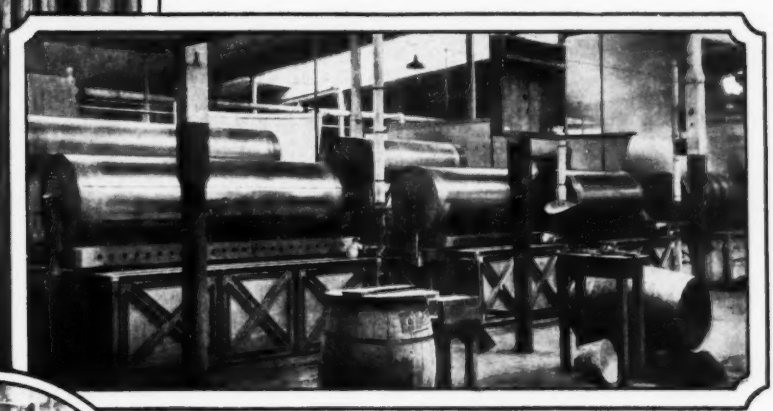
Experienced cotton yarn dyer desires position. Familiar with bleaching and dyeing all classes of colors on cotton. Young. Married. References. Box 331, American Dyestuff Reporter.

BUSINESS OPPORTUNITY

Chemist organizing a corporation for the manufacture of some desirable dyestuffs and chemicals for the textile industry is desirous of obtaining services of thoroughly experienced salesman as partner. Man in position to make moderate investment preferred. Address Box 332, American Dyestuff Reporter.



How CHENEY BROTHERS SECURE SUCH SUBTLE SHADES



Battery of Monel Metal piece dyeing machines, equipped with Monel Metal tanks and reels, in plant of Cheney Brothers, South Manchester, Conn.

Monel Metal dye jig at Cheney Brothers, South Manchester, Conn.

Monel Metal hand bark in Cheney Brothers dye-house.

Monel Metal dyeing equipment assures accurate shades and saves scouring time

THE texture and coloring of Cheney Silks are so notable for their quality that the world naturally wants to know — how do Cheney Brothers achieve such marvelous dyeing results?

Cheney Brothers will tell you that careful dyeing, expert research and the use of quality dyestuffs are reasons for the subtle shades of Cheney Silks.

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Monel Metal dyeing equipment, because it is so easily cleaned of old dye, permits the dyeing of many different colors in one machine. There's no "boiling-out" time—no wasted time—when you use Monel Metal equipment.

Monel Metal resists corrosion and it will not rust. It is tough and strong as steel—its smooth, hard surface will not catch or mar the sheerest silken fabrics. From every standpoint the use of Monel Metal is economical.

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ASK FOR "LIST B" OF MONEL METAL & NICKEL LITERATURE

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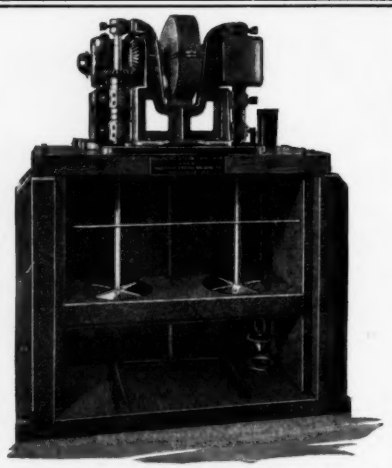

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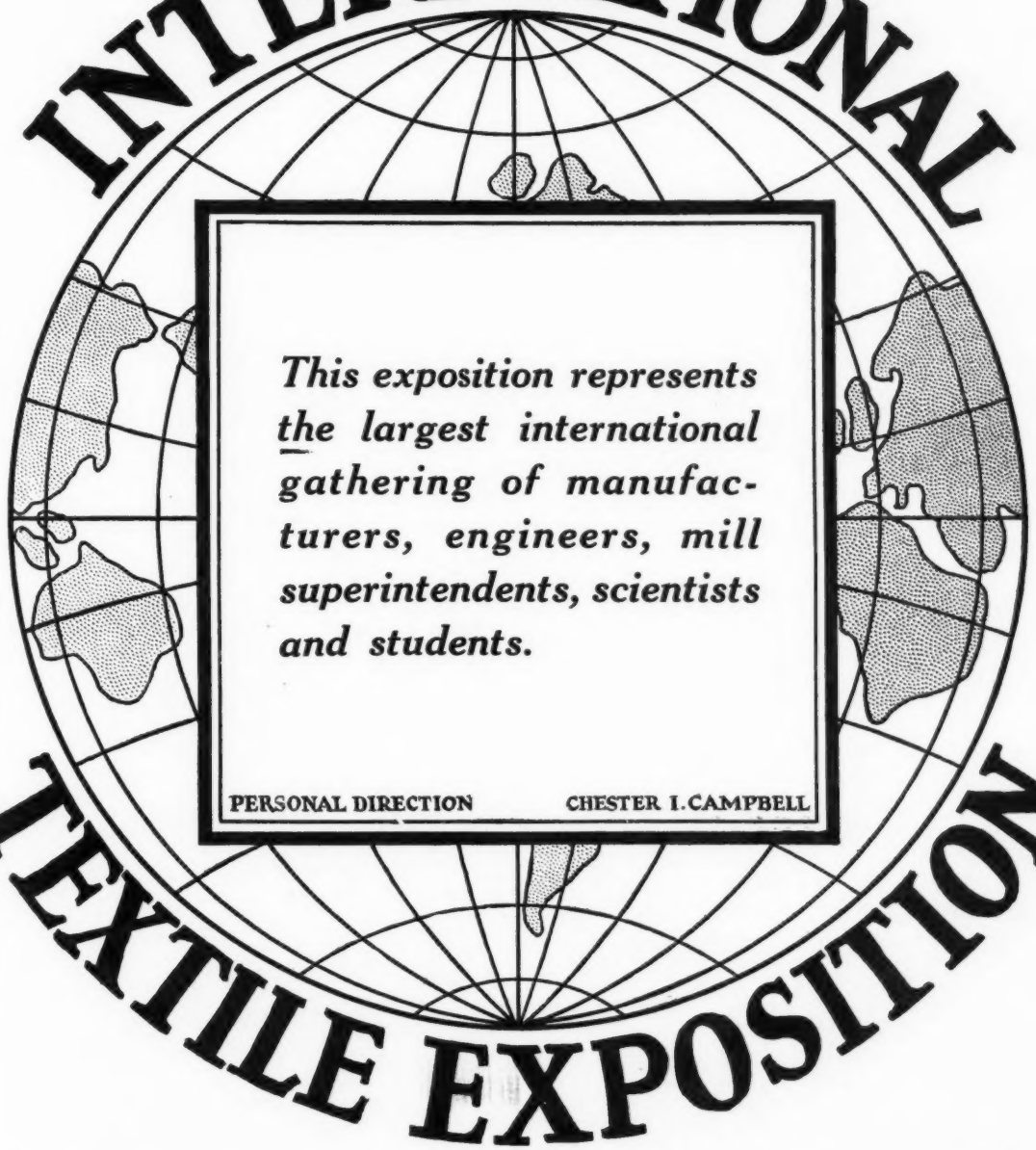

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classified alphabetically and by Schultz and Colour Index Numbers is one of the features of the new

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of the
American Association of Textile Chemists and Colorists

THIS tabulation forms a handy and reliable **Dyestuff Buyers' Guide.** It first appeared in the 1924 Year Book. For the new edition it has been revised, brought up to date and the Colour Index numbers included. If you know the name of any American color or merely its Schultz or Colour Index number you can quickly ascertain its classification, its maker and all competing products.

Fastness Tests

This Year Book also contains the Standard Methods of Determining the Fastness of Dyestuffs on Dyed Silk and Wool and Dyed and Printed Cotton. The tests are given for determining the fastness of dyes to laundry and mill washing, fulling, scouring and other agencies. The methods of making the fastness tests on each kind of fiber for each class of fastness are described fully.

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Copies of this volume may be obtained at $3 per copy from the Secretary of the Association, Walter E. Hadley, 5 Mountain Avenue, Maplewood, N. J., or from Howes Publishing Company, 90 William Street, New York City

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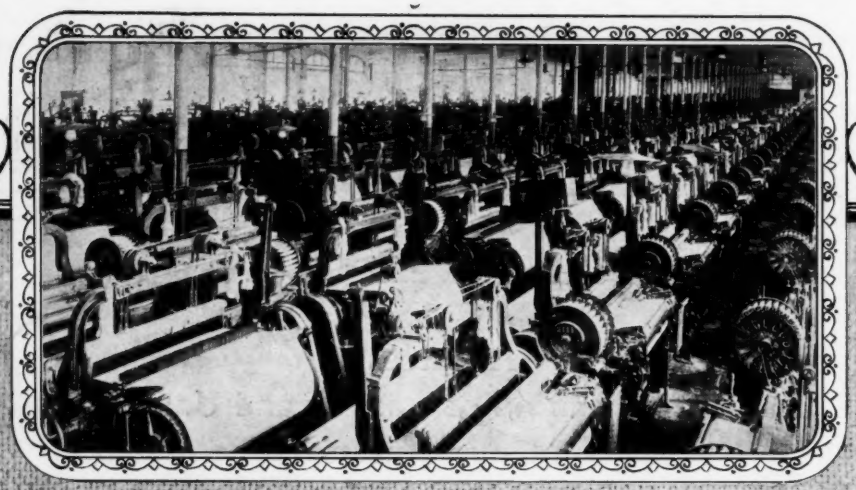

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